

DON'T ASK, DON'T TELL

One-Health Seeking Behaviours among Pastoralists in a Semi-arid Land



Photo: courtesy by Abdikadir Guto Kurewa

AICS Project AID11507:

ONE HEALTH: Multidisciplinary approach to promote the health and resilience of pastoralists' communities in Northern Kenya

Locality: Central area of North Horr sub-County, Marsabit County

Technical report: Anthropology-Ecology field mission of October-November 2018

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ONE HEALTH: HEALTH TO PEOPLE – HEALTH TO ANIMALS – HEALTH TO ENVIRONMENTS

FIELD MISSION TECHNICAL REPORT: ANTHROPOLOGY- AND ECOLOGY-RELATED ISSUES

By the editor: This report, to be considered a working paper, draws from the daily field-notes¹ derived from a collective exercise of discussion, sharing and capacity building in North Horr by the Anthropology & Environment Team (AET, in alphabetical order): Gabriella Comberti, Kame Wato Kofo, Abdikadir Guto Kurewa, Abdirizak Mohammed, Talaso Shamo, Isako Sori, assisted by the driver Boru ('Morning'). Kurewa, local anthropologist during the mission, elaborated a report for CCM which is integrated (with citation) inside this report.

All imprecisions and mistakes are to be attributed to the AET's oldest companion, Alberto Salza (from now on 'the editor'), who thanks all the local people inside the project area for their responsiveness, patience and accuracy in providing information.

Project title: "ONE HEALTH: Multidisciplinary approach to promote the health and resilience of pastoralists' communities in Northern Kenya"

Time-span of mission: from October 04 to November 10, 2018

Focal locality of mission: North Horr and satellite settlements, Marsabit County, Kenya



¹ A day-by-day document titled "North Horr Field Notes AET" is available c/o the Kenya Desk Office of CCM: it contains all the fine details and considerations gathered and elaborated during the Anthropology-Ecology field mission of October-November 2018.

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EXECUTIVE SUMMARY

The One Health approach builds on the consideration of an entangled interface human-animal-environment, concerning the health status of the three domains, not independently tackled. OH research provides an opportunity for enhanced understanding of a range of health impacts and solutions. In 2015, the World Health Organization designated 11 diseases as high risk for severe outbreak, 10 of which have a zoonotic reservoir or transmission vector. This makes One Health a response to emergency, by an approach going against the traditional one-dimensional response that keeps human health, animal health and environmental control separated and siloed, while research proved their entanglement (see Ch. 3).

This document is primarily directed to the One Health project partners and staff (particularly managers), to be used as a working paper with the concerned Kenyan institutions dealing with health, livestock, environment, population dynamics and economics. The tools and approaches here reported can be applied far beyond the limited scope of the OH project: they may become: a) a reference indicator of criticalities (see Ch. 5) and b) a path to operational suggestions, wherever One Health – notwithstanding growing criticism about its complex operationalisation (see Ch. 4) – is becoming a priority, as highlighted by communities and policy makers alike.

Public Health Systems have critical and clear relevance in the health status and health-seeking behaviour of communities. The pastoralists inside the Project Area (PA), although, show an interesting ‘denial strategy’ when dealing about human health (see Ch. 1), if compared to animal health: they state “We are all very well. No diseases around”, and “Remember: before vaccines for people, bring the ones for animals”. This deviation from what medical doctors consider a ‘health norm’ of self-preservation, must be understood in the pastoralist’s principle that his/her livestock keep the system ‘alive’ in the environment, in total syntesis, to the point that camels have the status of people and some trees are protected and called ‘bull trees’. Therefore, it is imperative, before implementing One Health, to build solid knowledge-bases (data + management) on culture/environment background baselines; the mission team – before and while inserting inside the communities – particularly explored: human terrain, pastoral movements, ritual calendar, health concepts, and resilience (see Ch. 2).

The Anthropology-Ecology mission managed to contact both nomadic and settled communities around and in North Horr, by means of variated research and participation tools: direct observation, mapping, environment transects along roads, non-structured interviews and focus group discussions (see Ch. 3).

Because there is no one-size-fits-all approach for One Health implementation, in this report we try to convey the complex texture of One Health with specific remarks and suggestions alongside the gathered data about: human health responses (private and public); animal health diagnosing and treatment; environment control of grasses and infesting plants; water local taxonomy, use and problems; weather and rain prediction; climate change issues (see field-notes throughout Ch. 4). Although fully built around the questions-and-answers exercise among the pastoralists around North Horr, this report intends to transfer the micro-dimension of health seeking behaviour inside the communities, by a series of voiced statements, *verbatim* transcribed. A specific brief section is dedicated to the economics of One Health, both at micro and macro scale.

Throughout the chapters, the voices of informants provide the narrative framework to elaborate scientific and anthropological comments and guidelines. In Ch. 4, all subsections are followed by remarks and suggestions (in italics for quicker retrieval by the reader).

Bypassing with difficulty the “Don’t ask, don’t tell” shame-syndrome about human health, and the lack of environmental personnel in the project framework (to be redressed), the main findings and deduced guideline points of the mission are:

- One Health is inherent the pastoral domain, but for pastoralists, health-seeking behaviour is negative for people, positive for animals, neutral for environments.
- There is biuniqueness but asymmetry in the relationship pastoralist/livestock in health-seeking behaviours.
- Movement of people and herds is imperative, above all in the environmental health domain.
- Special diseases like cancer and diabetes are more feared and recognised than the ‘common’ ones.

- Zoonosis, as diseases transmitted by livestock to humans and *vice versa*, are not fully recognised by pastoralists, excluding anthrax and Rift Valley fever, notwithstanding brucellosis is everywhere; reason given: “Animals are our life, they cannot harm us”.
- ‘Bush accidents’ are a serious threat for male pastoralists, but not apparent in statistics at health facilities, where women look for service mostly.
- Private health services are being implemented and considered more efficient/available than public ones, if not cheaper.
- Medicines, bot for humans and animals, are more and more diffused, but smuggled and counterfeited drugs are invading the area because of costs.
- Animal health posts are not contemplated throughout the project area.
- Human-animal health services combined are non-existent, likewise diffused environmental control by local authorities.
- Pastoralists are not environmentalists, but our concept of a ‘healthy’ environment is not scientifically sound: they look for a healthful environment.
- Modernity is leading to sedentarisation, where traditional resilience is ineffective; prepare a resilience toolkit dealing with insurance, access to credit, marketing, networking (all with precautions).
- New patterns of livelihood and density shall be exponentially connected to health by problems like pollution, conflict, epidemics, marginalisation.
- Water is believed good in itself (“It comes from God”); therefore, only quantity and rights of access – and not quality or safety – are considered important by pastoralists.
- Pollution is reaching threshold levels, above all in towns where plastics and pit latrine waste enter the high water table, while chemicals from pesticides make the household whereabouts dangerous for the health both of humans and animals, not to mention the damage to vegetation and wells.
- Technical weather knowledge is limited (no water cycle is understood), while traditional weather forecasting methods, like entrails reading, are still in use.
- Innovative means of weather forecasting are welcome, and most pastoralists are ready to use advanced cell-phone technology to ‘understand rains’.
- Climate change is mostly perceived not in increasing periods of drought (a trend around North Horr), but at the micro-scale of alien plant encroaching, killing local grasses
- No quick response to climate change is envisaged, therefore trained personnel and technological tools are demanded.
- A Free, Prior, Informed Consent (FPIC) must be obtained from the communities involved in the project area – not only from the local authorities – to prevent lack of awareness, participation and empowerment.

One Health is a dynamic process, not a sequence of unrelated end-states. During our mission we elaborated a ‘pathway model’ to be implemented from the very beginning. Like the mobile units of pastoralists, the OH project should move along 4 trajectories: 1) pathway to health; 2) pathway to water and pasture; 3) pathway to communication and social relationships; 4) pathway to modernity. From that we suggest to change the usual OH logo “Healthy humans, Healthy animals, Healthy environment” (all end-states) into operative drivers : “Health to people→ Health to animals→ Health to environments” (in Ch. 5).

The One Health paradigm is not based on a *sum* of competences about human, animal and environmental health, but is a *product* of a continuous flow of interrelated researches and activities (entanglement). Our field mission evidenced great difficulties at all levels of management and implementation (at all steps) in keeping entanglement as the operational priority. As an example, see the narrow focus on zoonosis by veterinaries and epidemiologists; this is a very important topic – not in the perception of herders, that have to be accompanied to knowledge by special training – but the environmental domain appears neglected, from microbiota to extreme weather events; lacking are also the aspects of vector-borne disease, water and food security, and antimicrobial resistance. Without proper entanglement (not $1+1+1=3$, but $1 \times 1 \times 1=1$), the OH project framework might implode in self-referential activities.

Chapter 1 – ENCOUNTERS & DERIVATIVES

1.1 – A NARRATIVE KEY

Saturday, October 27, 2018. At 08:00 AM we walk from North Horr to a settlement behind the Hori Guda water point. *Hori* means something like ‘wealth’: many camels² come to drink around here, making their owners ‘rich persons’ according to the local perception. In the semi-arid environment, we check the weather conditions as per conditioned reflex: the sky is covered by low dark clouds and high cumuli are all around. Many signs of falling rain towards north and southwest. Humidity is very high, and we regret having no meteo-measurement equipment. The obsessive eastern wind from 110° is quite cool: no rain is expected.

Southwest of the water point we reach a sparse settlement where the *aba olla*³, its head, is Rooba (born ‘During rains’)⁴ Qeqo, about 80 year old. He sports thick eye-glasses, a cell-phone in a leather gun-holster, and a white beard. Our assistant Talaso (‘Tuesday’) Shamo and the Education Expert Gabriella Comberti start talking with some women. We men are cut off by the local gender customs.

Later we are reported the words of Soori, (‘Light’, a colour of camels) Kushi, a woman aged 27, mother of two girls. She says that, when somebody of the family is sick, her husband decides what to do about it, according to the Gabra cultural beliefs and mores. Then we ask the fatal question: “How are you?”. Soori answers: “We are all very well. No diseases around”. End of conversation.⁵

We were previously informed by our interpreter/assistant Abdirizak Mohammed that the Gabra are very reluctant to put forth any disability or sickness⁶ in people, even during greetings. But still, after three weeks in the field, we had problems in accepting a mind-set that refuses to acknowledge weakness and disease in individuals, considering both a form of aggression to the whole community.

The same attitude of Soori was recorded many times afterwards; it happened mainly among women, but only because men do not even think of showing physical weakness: the mantra “Don’t ask, don’t tell” became a preliminary and temporary way to deal with a possibly shameful concept (illness), just like it happens among ‘alien’ communities when confronted by the so called ‘normality’ of other individuals and groups.

A symbolic representation of Gabra identity is the proverb: “A poor man shames us all”.⁷ This is valid also for social sickness and individual illness, because diseases impede the possibility to avoid poverty in the long run or after a sudden catastrophe (epidemics, conflicts, floods, droughts, etc.). Since individual

² The Middle East, the Sahara-Sahel belt and the Horn of Africa support a high population of dromedaries (*Camelus dromedarius*); they have one hump while, in Central Asia, proper camels (*Camelus bactrianus*) have two. About Africa, notwithstanding the difference, the use of the English word ‘camel’ is prevalent, even in scientific literature.

³ *Aba* means ‘father’; *olla*, wrongly translated as ‘village’, indicates a group of domed huts (from 2 to 30), in the same place, being not necessarily permanent: movements of the whole *olla* may be monthly, but sometimes the sparse settlement stays still for years, like in the reported case.

⁴ The Gabra give new-born babies the name of particular events at birth, of physical characteristics or simply the name of the day; the second name is the patronym. For details and a list of translated names, see Tablino P, *The Gabra. Camel Nomads of Northern Kenya*; Paulines Pub. Africa, Limuru 1999; Appendix 1g; pp. 366-375.

⁵ A full report about the female informants in the project area was written for CCM by Gabriella Comberti, Education Expert of the mission, assisted by Talaso Shamo. Their report *Our children live with animals, drink their milk and eat their meat: they are healthy. The voice of pastoralist women in a One Health project*, available at CCM, is a source of information also for this report, and many parts of it are hereafter included.

⁶ In medical anthropology we refer to the triad ‘illness’, ‘disease’ and ‘sickness’, where ‘illness’ is the individual and subjective experience of the event; the term ‘disease’ indicates the body’s dysfunctionality or pathology from an organic/biological point of view; ‘sickness’ denotes the social dimension of the problem, *i.e.* the way each society conceptualizes, manages and gives meaning to it. The triad shows the multidimensionality of the health phenomena, often underestimated by biomedicine, that typically considers only the ‘disease’ dimension. See Augé M & Herzlich C (eds.), *Le sens du mal : anthropologie, histoire, sociologie de la maladie*; Éditions des Archives Contemporaines, Paris 1983.

⁷ For a similar attitude among the Turkana, a neighbouring pastoralist group, see Anderson DM and Broch-Due V (eds.), *The Poor Are Not Us: Poverty and Pastoralism in Eastern Africa*, Ohio University Press, Athens OH, 2000.

mobility and mutual support are imperative for their survival as nomads, no Gabra may be allowed to go hungry, stay without animals, or be refused hospitality or assistance in case of illness. A person who does not help others is labelled *al baku* ('cow with no milk'), a stigma that remains affixed to the family for generations. The complex trust-practice (*dabare*) of camel cross-lending/loaning⁸ – by which a complex economic/social network is formed – exemplifies this support system: full-time relations are health and wealth.

The shame on manifestations of disease is a problematic attitude to deal with, if you are trying to enhance health systems among pastoralists: you cannot pinpoint specific collapse-prone cracks in health-seeking behaviour and illness-feeling. Even extreme pain must be controlled. Some years ago the editor saw a girl climbing two hours down the Kulal volcano (lava and rocks) on her broken femur. Two elders were walking aside her, talking all the way: she did not utter a lament. But when we loaded her on the Flying-Doctor plane, she burst into tears: she felt abducted from her pain-control cultural network, and left alone in agony. That is the point: a pastoralist, notwithstanding isolation and distance, is never alone. The force-field of family, lineage or group is always encompassing the individual, even when sick or in pain.

Inside this kind of closed health-field, the social determinants of diseases are not clearly visible, but – like bacteria or poverty – have immaterial dimensions: personal misbehaviour, evil-eye, sorcery, a curse, God's will (the most reported) make you sick. Shame is an obvious derivative of these determinants: as an individual, I am cause and victim of my illness at the same time. Shame is so powerful that even malnutrition becomes a stigma. At the North Horr Health Centre (November 06), we were reported that the distribution of Plumpy'Nut (or similar RUTF)⁹ to children is accepted with difficulty by their mothers, because children, when seen sucking from plastic bags, are going to be stigmatised by the Gabra community as 'poor', a shameful and socially unaccepted definition/condition by pastoralists.

Stigma and its consequences directly affect people's lives, just like health disturbances. Only at the end of the mission, our assistant Talaso Shamo reported a physical and cultural hindrance to her performance as an interpreter. We noticed that she never took notes during interviews and focus-group discussions, notwithstanding our rebukes; anyway, she showed an excellent memory while transferring her info, so we did not insist. At the end (November 07), she revealed to be left-handed (also in writing), a strong physical stigma inside the Gabra community: a girl with that 'disability' shall never marry. Her grandmother used to beat her on the knuckles if seen using her left hand; sometimes she was burnt under her left elbow to prevent writing with the 'wrong' hand. Therefore she grew very attentive not to show left-handedness in public, above all among the pastoral communities where traditional biases are still strong and could disturb her work as an interpreter and put our project in a bad light among the Gabra: stigma is contagious.

About health, after a while, we started not asking and people never told. With exceptions: cancer and diabetes were repeatedly reported as terrible, fatal diseases affecting many individuals in the community. Some voices from the ground about these 'new diseases':

At Barambate (October 10), Wario ('Early night') Abutho (M), aged 67: "There is a new disease they call cancer, very new, with no traditional cure for *dukub lubu*, the throat cancer".

At North Horr (October 13), Ibrae ('Sunday') Jillo (M), adult-education teacher: "According to our perception, cancer started to be a serious problem since 1986, after oil-prospecting surveys and the fast expansion of veterinary medical treatment of parasites in livestock.¹⁰ Cancer is connected to genetics, but also to the environment: it may be caused by different pollutants, from medical waste to plastics, from dip treatment and chemical washing of animals to the consumption of meat and milk of treated animals. Cancer cases are less frequent in people using earth dams if compared to the ones near boreholes: these last ones reach deep water, not rain water".

⁸ Sora T, "System and Reality: The Camel Trust System of the Gabra", *African Study Monographs*, Vol. 18 (3, 4), December 1997, pp. 157-174.

⁹ Plumpy'Nut is a Ready-to-Use Therapeutic Food (RUTF); this peanut-based paste in a plastic wrapper is used for treatment of acute malnutrition; its 92-gram packets, administered at home especially to children, allow larger numbers of malnourished to be treated.

¹⁰ In the Sahara desert (Algeria, 1976), the editor witnessed occasional spilling/burial of radioactive material used in oil prospection. He was also on the eastern shores of Lake Turkana when the oil company helicopters (flying objects never seen before, around there) started prospecting in 1986, leaving white paint signs all over the place; anyway, by no means this signifies that a nuclear pollution is in the Project Area.

At Dukana (October 16), Abdirizak Mohammed (M): “Children may be fed only with tea and milk, but sugar might be banned for fear of diabetes, because this ‘disease-word’ spread about into the community”.

At Eel Beso (October 22), Shuka (‘Beloved’) Abudho (F), 40 years old: “Cancer is becoming the most dangerous and feared disease. I heard that many people from our area died of this sickness in faraway hospitals, down to Meru”.

At Hori Guda (October 27), a group of elders (M): “About human health, we are worried by diabetes and cancer: they are new diseases in our area”.

Like ‘special foods’ (from maize-flour to sugar) inserted into a diet that used to contemplate only milk, blood, meat and berries, ‘alien diseases’ like cancer and diabetes are outside the ‘shame influence’ and can be talked about by everyone: they are not Gabra, they are external killers.

Derived from this mental (denial) and physical (distance) context, fitness becomes more important than health. A pastoralist would look for a guaranteed minimum of efficiency for himself, his family and his animals, instead of aspiring to an unattainable individual health-optimum, what bio-medics consider a sanitary reference to be achieved at any cost.

What really counts is the pastoralist’s decision matrix, the energy field that forces the person to continuously look after his/her animals, hoping that climate and ecosystem do not prevent success; therefore we suggest that health-seeking behaviours over the human-cum-animal terrain become the main domain of observation for future field missions. In this blurred health-landscape, a derivative pathway to a 3-faceted health-seeking behaviour is the key to consequent action: for pastoralists, health-seeking behaviour is negative for people, positive for animals, neutral for environments.



Photo 1: A Gabra camel-herder along the North Horr-Dukana road (courtesy by Alessandro Demarchi, TriM)

Chapter 2 – BASELINES

2.1 – HUMAN TERRAIN

The human terrain of the One Health project is multi-dimensional pastoralism – from short- to long-range strategies – in semi-arid lands. The main involved population is that of the Gabra of North Horr sub-County, but the One Health project is by no means exclusive in terms of group-affiliation or religion: all people inside the Project Area (see map 4 in 3.3) are going to benefit from the OH approach. On the other hand, the editor cannot avoid the fact that the great majority of the information gathered in interviews and focus-group discussions is of Gabra origin and refers to their culture: therefore we are bound to report about a Gabra-related pastoral environment and health-culture system, unless diversely specified. Health-seeking behaviours derive from socio-cultural sets that involve individuals' and groups' decision-making in their multi-dimensional environment (SES)¹¹. Therefore, in this chapter we sum up the baseline information – gathered from literature and field activities – about the cultural and ecosystemic variables that shape the beneficiaries' behaviours, variables that must be considered when transferring health knowledge and guidelines, which is within the scope of the One Health project. These baselines are an imperative knowledge for all personnel involved in the One Health project: during the timeframe of our mission, all efforts have been made to individuate, analyse and disseminate among the OH personnel the anthropological framework inside which all activities must thereafter be designed and performed.

Linguistic note: The Gabra people speak a Borana-related language, with influences from their proto-Rendille-Somali origin. The Gabra language is Afro-Asiatic (Hamito-Semitic)→ Cushitic→ Eastern→ Lowland→ Oromo→ Southern→ Borana, with Gabra as a dialect. Borana is tonal, with a complex transcription. In this report, we utilise a simplified standard transcription as found in literature. Sometimes, our informants and interpreters transcribed names, localities and words according to their spoken and written knowledge. Mainly, they tended to elide the last vowel (a short one), which might be a modern trend in Gabra linguistic pronunciation.

Phonetics follow the standard Swahili writing and pronunciation: vowels can be long (doubled in writing, when acknowledged by ear) or short, while particular consonants are, for instance, *q* (ejective and guttural, with a slight click-sound, sometimes written *k'*) or *d'* (implosive, also written *th*); some consonants used to be doubled in spelling – to underline their explosive sound – but now this feature is becoming obsolete.

2.2 – CULTURAL BACKGROUND

The Gabra are dromedary herders inhabiting parts of Northern Kenya and Southern Ethiopia.¹² Despite the Borana linguistic affiliation, the other aspects of the Gabra culture are closely related to Rendille and the hypothetical early non-Islamic proto-Rendille-Somali cultures.¹³ The Gabra are divided into two clusters: Miigo and Malbe. The former group lives in Ethiopia, while the latter is found around major and minor settlements within Marsabit County. In Kenya, the population of the Gabra is estimated at 89,515 (GOK 2010).

Gabraland (see map 1) extends from the Mega escarpment in Ethiopia to the north, Lake Turkana to the west and Bula Dera plains to the east. The southern boundary runs from north of Mt. Marsabit through the southern end of Chalbi desert to Lake Turkana.

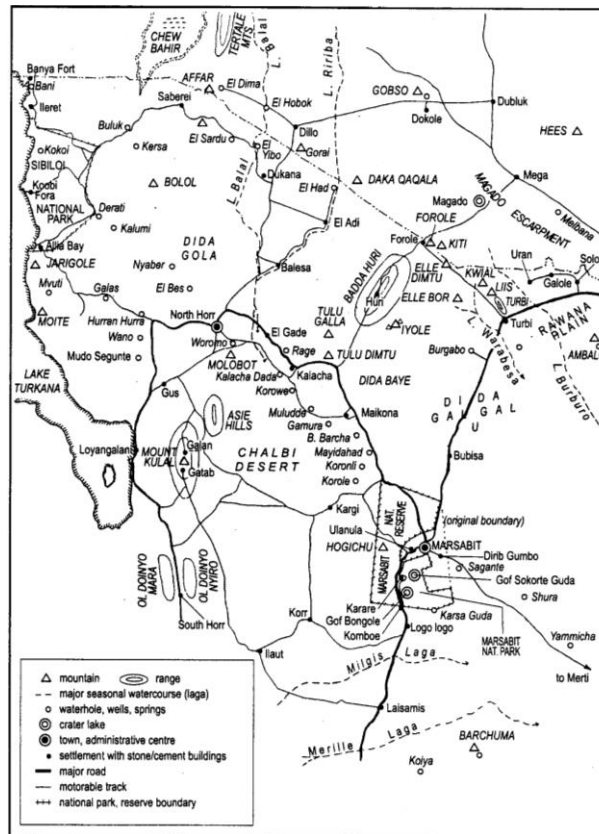
The Gabra pastoralists utilise the lower parts of Mt. Marsabit and Mt. Kulal, while the more elevated areas of the highlands are used by cattle-keeping pastoralists who include Borana and Samburu respectfully. The lowlands are characterised by rocky lava plateaux with sparse trees, shrubs and seasonal grass. The area lacks permanent water sources; people and livestock depend on seasonal streams and dug-wells. The

¹¹ A Social-Ecological System (SES), is a bio-geo-physical unit plus its associated social actors and institutions.

¹² The 2.2 paragraph is derived from the report of the anthropologist Abdikadir Guto Kurewa, Kenya National Museums, assistant to the editor during the mission; see Kurewa AG, *Report from the Assistant Anthropology Expert of the One Health Operational Research Deployed in North Horr Sub-County*; CCM, Turin 2018.

¹³ Schlee G, *Identities on the Move: Clanship and Pastoralism in Northern Kenya*, Gideon S. Were Press, Nairobi 1989; see also, by the same author, *Ethnopolitics and Gabra Origins*, Max Planck Institute for Social Anthropology, Working Paper 103, Halle/Saale 2008.

Chalbi¹⁴ desert is the main drainage system that is transformed to a shallow lake during rainy seasons. The area receives two rainy seasons. They are highly variable, with a coefficient of variation ranging from 30% to 50%, according to Kenya's National Environment Management Authority, 2006.



Map 1: Gabraland before year 2000¹⁵

Water points are scattered, while different vegetation niches are utilised by varied livestock species: dromedaries, cattle (in reducing numbers), sheep and goats. The availability of water and pasture governs the Gabra life. Being a critical element for survival, water is managed on traditional norms and regulations. As such, the Gabra devised a system of well-ownership managed by the clan or family who constructed the well and their descendants. Each well is managed by the *Aba Eela* ('father of the well') who schedules the animal watering time for the community.

To survive in one of the harshest environments in the world, the Gabra have evolved complex cultural systems. Besides depending on the dromedary as their key-species, they have developed a distinct system of time measure, social organization, rituals and mutual cooperation that are guided by strict individual codes of conduct.¹⁶ In terms of social structure, the Gabra are divided into 5 sections (phratries): Algana, Galbo, Gara, Odhola and Sharbana. Each section is further divided into two halves (that anthropologists term 'moiety'). As such, some person of the clans belongs to the senior *Jilbo* half and the other to the junior *Losa* half. The two halves are led by the *hayu*, who are elected judges and political decision makers. The *hayu* are preferably chosen from specific senior clans called 'bull clans'. Within each clan, the *jalaba* are elected: they play a key role in overseeing the division of labour and the best care of livestock, as well as solving disputes and maintaining social harmony within their respective clans. The phratries have special settlements, called *Yaa*, where the senior elders – custodians of the sacred paraphernalia – live with their

¹⁴ Chalbi means – and therefore evokes in Gabra minds – a 'barren, empty land with no shrubs nor trees' (cfr. the Sahara desert or 'Empty Space', and the 'Empty Quarter' desert in Yemen/Oman).

¹⁵ Source: Tablino P, *op. cit.*; p. 16.

¹⁶ Stiles D, "The Gabra: Traditional social factors in aspects of land-use management", *Nomadic people*, Vol. 30, 1992; pp. 41-52.

families. The *Yaa* is the spiritual, political and juridical headquarter for each section. The *nabo*, the sacred shrine, is found at the centre of the *Yaa* and is specifically used for prayers.

From each phratry, three men are selected as custodians of the sacred paraphernalia: a drum (*dibe*), fire-sticks (*uchuma*) to open rituals, and an ivory trumpet (*magalata*); all are used during ritual ceremonies. The Gabra practice a monotheistic religion: Waqa is the name of their God. Prayers, centred around the wellbeing of humans and camels, are conducted by the priests *qalu*, who receive God's blessing in form of rain (*roobo*).

The Gabra society spins around a generation-set system called *luba*, which is a simplified version of the Borana *gada* system.¹⁷ Through this, male undergo social transformations from one *luba* grade to another every 7 years. The grading system begins from childhood, through circumcision, marriage, political eldership, religious eldership and, finally, retirement. The women will take the *luba* grade of their husbands. The Jilla Galani ceremony – organised at 7-year intervals – marks the change from one *luba* grade to the next. Each phratry makes a pilgrimage to their sacred *Jilla* site to mark this transitional ceremony. Marriage is considered to be one of the main criteria upon which men can assume political or religious roles. The *gaddom* (political elders) and *d'abeela* (religious elders) are the most important grades. The *d'abeela* wear a kaolin-white cylindrical turban called *hitu* and they guard the Gabra traditional law (*ada*).

The social organisation of the Gabra is embodied by a strong political and religious authority, whose main task is to oversee the division of labour, one of the main tasks in livestock-management. The Gabra practice herd splitting, a strategy to manage livestock that is based on existing natural resources (mainly water points and grazing areas) and available/manageable labour. The decision to move or split livestock is made at the household level by the *aba olla*, the household head.

Due to the uncertainties and risks involved in herding, each *olla* is obliged to construct mutual relationships and social cooperation with the others. To this end, the Gabra elaborated complex kinship ties, like *abuya* ('uncle') and *halkuma* (inter-clan marriage), that involve gifts in camels, free labour and mutual rituality. Furthermore, by the loan-system called *dabare*, animals are loaned from one person to another over a long period of time. One is allowed to borrow a young female camel which shall be returned to the owner after it gives birth to the second generation. Technically, the borrower is allowed to keep the first-generation offspring, though they are still considered to be on loan.¹⁸

Outside the social or kinship ties, the Gabra also exploit their historical ties with other communities, especially the Borana. Through an institution known as *tiriso*, members of the Sharbana clan among the Gabra, and the Karayu of the Borana (in particular with the Bere sub-clan) share hospitality relationships that allow them to borrow livestock from each other.

2.3 – TIME AND RITUAL CALENDAR

In addition to these social and historical ties, the Gabra moral and religious conduct provides a basis for social cohesion and collective actions. They adhere to the restrictions embedded within their lunar calendar which governs the appropriate time for certain activities and animal transactions to be undertaken. The Gabra have twelve lunar months – out of which six are considered to be propitious while the others are considered unpropitious – to conduct activities such as marriages, movements and buying/selling of dromedaries. The calendar sets aside specific months and days to conduct ritual ceremonies (e.g., *Yaqo* month is for weddings and *Soomdeer* Two for *sorio*, the camel blood-aspiration), such as *Almado* and *Jilla*. The family *sorio* is a ceremony in which animals (usually shoats and rarely camels) are sacrificed and their blood is smeared on all the camels and male members of the household, that must be present together with the family head and his first son, compulsorily. This kind of ceremony happens at least 3 times a year, but many circumstances may elicit a *sorio*, from rites of passage to rain or peace pleas. All the ceremonies force movements of pastoralists and herds alike, without considering opportunity (pasture), time (season)

¹⁷ Legesse A, *Gada: Three Approaches to the Study of African Society*, Free Press, New York 1973; see also Tablino P, *op. cit.*; p. 312.

¹⁸ Soga T, "System and Reality: the camel trust system of the Gabra", *African Study Monographs*, 18 (3, 4), December 1997, pp. 157-174.

or profit (overgrazing of environment, excessive milk consumption and movement stress to animals). According to informants during the OH mission, at household level most people are now postponing *sorio* because there is no rain. For ceremonies like weddings, the pastoralists need milk, animals to sacrifice, etc.: so people shift their ceremonial days according to the ‘most natural’ calendar, counting the appropriate days for the occasion. All ceremonies are conducted within the 3 months known as the ‘camel months’. Gabra perceive the year according its rain periods – not a surprise due to the relationship rainfall→ grass→ livestock – but keep a complex system to name time, combining the solar year with the lunar one. The solar year is recognised with four seasons (even if only two, the rainy ones, enter in most of the lay conversations).

A solar year is called *ganna*, which also refers to the long rain-season, being the epitome of ‘good time’. A year consists of four seasons. The *bon* is the hot and long dry season (December-March). *Gan* is the heavy-rain season (April-June). *Adolesa* refers to the cool dry season (July-September), while *haggaya* refers to the short rain season (October-November).

The combined Sun-Moon year begins in (1) *bon haggaya*, which lasts for 100 days, and (2) *gan*, that follows for 160 days. On the 161st day after the beginning of *gan*, the *ibid* (fire ceremony) is held, at which time (3) *adolesa* begins, lasting 90 days. (4) *Haggaya* then starts and lasts for 15 days. *Haggaya* is also called *almado* because the milk-offering ceremony named *almado* is held 3 times during this period. The first *almado* is held on the first day of *haggaya*, the second occurs on the 8th day of *haggaya*, and the last *almado* offering marks the end of the solar year on the 15th day of *haggaya*. The next day of the last *almado* is called *uluqo*, or New Year's Day, at which time *bon* begins.

According to research on terminology and mental perception, the Gabra solar year is not directly connected to the four seasons, but is made up of 6 periods:

(i) *Dibba Abba Guma* consists of 10 decades of days (100 days); (ii) *Dibba Safam* consists of 10 decades (100 days); (iii) *Jaatama adolessa* consists of 6 decades of days (60 days), (iv) *Odoli ibidda bobeessa* consists of 3 weeks (21 days), (v) *Torban sagali* consists of 9 weeks (63 days), and (vi) *Almado* consists of 3 weeks (21 days). The Solar year of the Gabra consists of 365 days and has no leap year.

A suggestion for OH personnel: when choosing dates for missions, clinics or workshops, we should keep in mind the Gabra approach to days. There are two words to say ‘day’ in Gabra: one is *guyya* and refers to the physical period of time; the second is *Ayyaana*, referring to the spiritual significance of the day: each day of the week – and certain days of each month – are believed to have their own *Ayyaana*, to be propitious or unpropitious. *Ayyaana* may mean ‘good luck’, but also an entity that can enter people and animals and cause serious, prolonged illness (especially mental). For what is relevant to the OH project, the concept is that each day of the week has its own ‘spirit’ or inner force, often associated with animals; for instance, *ahada* (Sunday), is also *Ayyaana gala*, ‘the day of the camel spirit’. As a reference for deciding the best meeting days, we provide a table:

<i>Ahada</i>	Sunday	<i>Ayyaana gala</i> (camel)	Propitious
<i>Alsinina</i>	Monday	<i>Ayyaana ree</i> (goat)	Very propitious (note association with goats)
<i>Talassa</i>	Tuesday	<i>Ayyaana woraabesa</i> (hyena)	Inauspicious (note association with predators)
<i>Arbaa</i>	Wednesday	<i>Ayyana arbaa</i> (elephant)	Inauspicious
<i>Kamisa</i>	Thursday	No <i>Ayyaana</i> (or a dead person)	Very propitious (note the missing spirit as positive)
<i>Gumata</i>	Friday	<i>Ayyaana d’aabela</i> (elders)	Propitious (note association with humans)
<i>Sabdi</i>	Saturday	<i>Ayyaana looni</i> (cattle)	Propitious

Table 1: Gabra days with their ‘spirit’ and propitiousness.

During our mission, we tried to clarify the complex ties between lunar and solar calendars, both utilised by Gabra. This field activity was quite difficult because even time is subject to change in the perception of modernity: therefore, fewer and fewer people are acknowledgeable and reliable when talking about ‘Gabra time’. For instance, we managed to observe from far (foreigners are not allowed in) some activities of the *Almado* (New Year) ceremony, but could not certify accurate dates for its beginning and end. The intersection of the solar calendar with the lunar calendar and the ceremonial calendar is so complex that it

is difficult to draw a fully correct and coherent narrative from informants.¹⁹ Aware of their limits, we report some field notes:

Info about the Gabra year by Abdirizak Mohamed, November 02: *Almado* (beginning of the year) → *furmat* (expecting rains) → *bona* (dry period) → *ganna* (long rains) → *adoles* (dry and cool period: winter, when camels have to go down the mountains and stay inside the *lagga* for warmth) → *haggaya* (after the ending of the old *Almado*: after 7 days a new year starts).

We tried to confirm this information on the same day (November 02) with some elders at Hori Guda: “In the year [unspecified if solar or lunar] there are 12 months: 1) *Yaqo*; 2) *Raggar One*; 3) *Raggar Two*; 4) *Faite*; 5) *Ji Boor One*; 6) *Ji Boor Two*; 7) *Soom Deer One*; 8) *Soom Deer Two*; 9) *Soomo*; 10) *Furam*; 11) *Iddi Yaal*; 12) *Arrafa*. Some months have 30 days and others 29 [to be further investigated in a calendar use that is lunar and solar at the same time].

Years are named after week’s days: the one started during the October 2018 *Almado* period is called *Arbaa*, ‘Wednesday’. An elder from Hori Guda reported on November 02: “To tell one from the other, the Wednesday year before this one was nicknamed ‘Wednesday Year of the Drought’”. By this naming system, relevant historical and ecological information is transmitted and kept for future generations. Following oral denominations of years is a tool to individuate in Gabra history all meteorological cycles and subsequent conflicts or important events, with emic²⁰ solutions.

2.4 – DROMEDARIES, HERDERS, ROUTES AND MOVEMENTS

The Gabra herders are inserted in an arid environment, where resources like pasture (at low density and poor in protein) and rain (less than 250 mm per year) are erratic and unreliable. They have to count on a species of livestock able to resist heat, thirst, hunger and wide-range errands in search of resources. The obvious choice is the dromedary, the dominant animal for the Gabra. All their relations are reinforced by the common beliefs and codes of conduct involved in tending after their camels. Despite their economic significance, they are also considered to play a sacred role, because camels are thought having the quality of the *lagu* (divine power). The same level of divinity or sacredness is given to certain officials such as the high priests (*qalu*) and the sacred objects they keep in the *Yaa*. As such, the belief and fear of ritual curses that come about with improper care of camels, foster the Gabra to behave communally for the sake of their interest as a community. As Salesa Guyo, 74 years old, puts it: “For me, the camel is the animal number one; without a camel you cannot have a wife. In the near past, camels were of the utmost importance, not only for economical use and milk, but also as a mean of transport. Nowadays we use lorries and cars, but then only camels. Priorities? First thing is the camel; after comes the pasture; and then water” (North Horr, October 12). Ibrae (‘Sunday’) Jillo, aged 58, adds: “Gabra recognize the reality of their ethnicity and clanship through the camel-trust system; for the individual, to practice the trust system with camels is to identify himself with both clan and Gabra” (North Horr, October 13).

The rich Gabra terminology about their dromedaries (*gaala* in general) speaks by itself about the relationship human/animal around North Horr (in alphabetical order):

01. *agayooole*: calves born during the short rain season
02. *dirora*: young male, developed but not mature yet
03. *d’ooro*: a milch-camel whose milk may be drunk only by men; women might get sick out of it (unexplained)
04. *d’ufaala*: castrated male, for slaughtering
05. *faile*: castrated male trained for general transport
06. *gannole*: calves born during the long rains (*ganna*)
07. *gurbo*: young male
08. *hala*: female that has calved
09. *hirmaana*: females that have recently given birth

¹⁹ For a full report about all kinds of calendars among the Gabra, see Tablino P, *op. cit.*, pp. 36-59 and 376-385; and Soga T, “Changes in Knowledge of Time among Gabra Miigo Pastoralists of Southern Ethiopia”, *Nilo-Ethiopian Studies* 10, Tokyo 2006; pp. 23-44.

²⁰ In anthropology, the word ‘emic’ (opposite: ‘etic’) refers to a viewpoint obtained from within the culture-set (from the perspective of the subject).

10. *koeesa*: female whose calf died, but still has milk
11. *korma-gaala*: breeding bull; it wears a distinctive rope as a necklace (*ooroge*) and is never beaten
12. *orge*: young female
13. *roocha*: castrated male, used for specific transports, like huts (*godana*), water (*dana*) or goods (*bunnaqa*)
14. *rukum*: male for riding, only by police (still active in 1973) or foreigners, never by the Gabra
15. *saarma*: female as a trophy by the maternal uncle to somebody who killed an enemy (always with a bell)
16. *yabot*: young female, developed, but that has not calved yet²¹

There is an intrinsic homology between people and dromedaries in Gabra culture; for instance, as recorded many times during the mission, *kando* (a generic word for ‘fever’), is considered the “malaria of camels” [e.g., Baraqa (‘Before dawn’) Kae, at Eel Beso, November 04: “Fever comes to humans and animals alike after rains and before dry spells; for dromedaries, the agents are *kitan shilmi*, camel-flies”].

Being nomadic pastoralists on a rather unproductive territory, the Gabra rely on movement to access sparse, scarce and low-quality resources. They well represent the mobile capital-on-hooves model of exploitation for arid and semi-arid lands, with some interesting specificity.

The limiting factor of a pastoralist is not rain but grass (available, accessible, palatable); grass connects pastoralists to their livestock, and is the motor for movement. The quantity of grass is function of rainfall and soil. In northern Kenya, rainfall is erratic in time and space; that is why mobility is an imperative for nomads: during climatic changes and unreliable seasons they must lead their livestock to variable grazing areas, according to probabilistic decisions: one has to understand where and when to go, in order to get enough nutrients and/or water for animals and, consequently, for people.

The productivity of the nomadic territory is usually very low. This must be compensated by the spatial extension of available resources. The problem of the pastoralist lies in the tendency of the ecosystem – unbalanced, but nevertheless permanent – to a non-equilibrium state. Droughts and diseases can reduce dramatically the efficiency of his strategies, killing most of livestock.

Pastoralists are organized in mobile units, quickly responsive to climatic and ecological changes. If a large group is forced to stay in one place, it will consume all resources of grass and water in a fixed time. If, by climatic strain, resources are not to be renovated – as per the prolonged droughts of the Gabra territory – then humans and animals are liable to severe problems of survival. So the social system of the nomads is organized in moments of fusion and movements of fission. Fusion means the aggregation of people and animals in temporary settlements near water points and dry-season grazing areas. Fission means the separation of large groups and herds in small units of people and animals in case of diffused resources, like temporary water holes and rain-triggered pastures.

The fluctuating organization of pastoralists tends to the isolation of small groups. To prevent this potentially disruptive trend, pastoralists have developed a strong sense of tribe, clan, moiety (as per the Gabra) and family. This genetic and cultural binding is the cohesive agent for pastoralists, who follow a ‘quick-silver model’ (separation of parts when hit by some force and reunion because of ‘superficial tension’, i.e. family ties). In the model, different members – according to age and gender – fulfil different niches and perform separate tasks, tied – as per superficial tension in quick-silver – by the concept of the Household-cum-Animals Unit.

This leads us to an anthropologic consideration. In an ‘explosive environment’ of fusion and fission, social bindings tend to become a burden for the economic livelihood: it would be better to think about the difficulties and losses that livestock have to undergo (at least three times a year) in order to attend the *sorio* ceremony. All animals congregate at the same time in one place, where pasture might be scarce, even if ceremonies are usually held during ‘fat months’, with rain, grass and milk. The junior attendants, in the ongoing transition to modernity (see 2.5), risk losing their jobs in the Kenyan towns where they work in – as stated by a group of elders at Hori Guda, November 02 – for the compulsory sake of an outdated ceremony like *sorio*. The elders said: “We accept no excuses: if a young man, a first son, works in Nairobi, he knows the moment when *sorio* is going to be held and he shall take the necessary permissions and means of transport in order to join his family for the ritual sacrifice of camels and goats and the smearing of blood” (at Hori Guda, November 02).

²¹ Tablino P, *op. cit.*; pp. 297-298.

This imperative to participation is an immaterial tie for the whole household, whose unity is mined every day by the geographic (distance), ecologic (erratic seasonality) and economic (livestock risks and losses) settings of the pastoral life. *Sorio* is the superficial tension that keeps human/animal molecules together, and the ritual calendar (see 2.3) acts as a powerful force-field connecting the various variables and end-states of the pastoral SES. In any case, the Gabra of the North Horr area have an augmented pattern of movement, not fully following the seasonal style of the Samburu, Turkana and Somali, for instance. This is not a surprise, in the erratic and volatile environment they have to face day by day. A climatic chart of rainfall shows a lot of deviation from the norm, every year.²² Therefore, the Gabra must adapt not only to the environment, but also to a fixed model of behaviour: they face crucial decision-making at every step.

The slight but decisive divergence of the Gabra from the fusion-fission model lays in the drive to union imposed by family ties and religious compulsory ceremonies and pilgrimages, like the Jila Galani that has to be performed every seven years with all animals in a fixed ceremonial ground; this religious livestock-herder binding is contrasted by the ecological drive to fission (and here the Gabra diverge from the model): during the dry seasons, the Gabra send their youth and valid elders to faraway grazing camps (*fora*), while the rest of the families joins other lineage-related households around the permanent water points, with the less important livestock (mainly shoats and some milch camels) to survive upon.

According to a bio-medical metaphor, this strategy can be called 'clotting of space-time', and is particularly evident in the attitude and response to modernity: nowadays Gabra tend to form sedentary-looking agglomerates in function of government services, health, permanent water and aid. This 'villages' tend to become towns, but this strategy is temporary: Gabra are ready for movement, any time. A constraint to this drive is the growing worry about health of livestock and (secondarily) people.

Paths are far more important to pastoralists than places, as explained by Abdikadir Guto Kurewa:

The physical migratory paths across which livestock move and are exchanged represent a signpost that conjures the social landscape and the web of social relations and memories of the past, as well as negotiating future alliances along these paths where animals are exchanged as gifts/loans. The metaphor of 'path' among pastoral societies is crucial for building real and symbolic capital in terms of both human relationships and herds. In addition, the metaphor of 'paths' also extends beyond the physical and social world to include anatomy and physiology – what one eats moves along the 'food path' – and also includes the divinatory reading of animal intestines, a cultural practice widespread in East Africa. As such, the image of paths and flows also characterises the inner working of the body, including the essence of human life: breath, knowledge and power.

Few studies have taken up a landscape perspective in the study of African pastoralist societies; as a result they give more attention to the study of 'places' rather than 'paths', diverting attention from the very characteristics that distinguish pastoralist from sedentarized societies. [...] Nevertheless, developing such a model on the concept of path and mobility could offer a more fruitful means of understanding the social segments, spatial configuration, motivations and embodied experiences of mobility: the 'pastoral landscape'. [...] It is believed that if a person neglects the reciprocal cycle of food and livestock sharing, and the movement of life-sustaining forces and flows are constrained, this will eventually result in illness, misfortune and poverty.²³

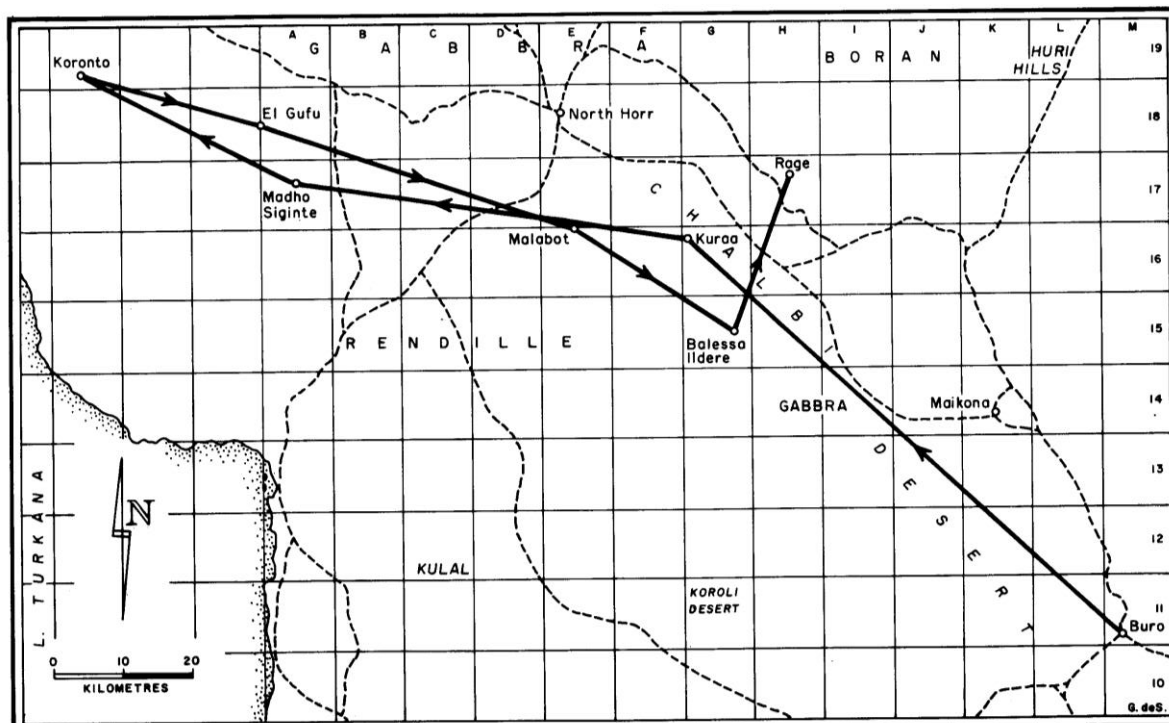
Any project tending to enhance health among people and their animals (not to speak about the environment for the moment being) simply enhances their agency: the ability to take decisions, make plans and try to fulfil expectations of a better life. In our case, Gabra agency is controlled and provided by a special unit, far beyond individuals: household members plus their livestock. Therefore, movements

²² See the Map 6 "66% Reliability of rainfall of the first rainy season" and the Map 7 "66% Reliability of rainfall of the second rainy season" in Marsabit District, Kenya, *Range Management Handbook*, Vol. II, 1, GTZ-Ministry of Livestock Development, Nairobi 1988, and the Integrated Project in Arid Lands (IPAL), technical report B-3 by Gernot Bake, *An Analysis of Climatological data from the Marsabit District of Northern Kenya*, fig. 7, p. 25.

²³ Kurewa AG, *Funerary Practices and the Materiality of Personhood in the Later Pastoral Neolithic Period in Kenya (3400- 125 BP)*, unpublished thesis, Department of Archaeology, University of York, 2018; pp. 15-16; see also Lane PJ, "Trajectories to pastoralism in northern and central Kenya: an overview of the archaeological and environmental evidence", in Bollig M, Schnegg M and Wotzka HP (eds.), *Pastoralism in Africa: Past, Present and Future*, Berghaha; Oxford 2013; pp. 105-143.

(direction and length, plus season) are left to individual choice, as seen in maps 2 and 3, where two families were followed in the period April 1980 – March 1982.

In map 2: Galgallo's camp moved from Buro to Kuraa (85 km) during the long rain season of 1980 (almost failed). From Kuraa they went to Madho Siginte because of lack of pasture (57.5 km), proceeding to Koronto watering points near lake Turkana (34.5 km) in the long dry season of 1980. The long rain season of 1981 saw Galgallo's camp move back to El Gufu (27.7 km). From there, during the same season, the camp moved to Malabot (47 km), to proceed then, during the long dry season of 1981, to Balesa Ildere (28.75 km). Finally they went to Rage during the short dry season of 1982 (25 km). Galgallo's family – where there were no youth able to move to distant grazing areas – covered a distance of 177 km the first year and 128.25 the second.

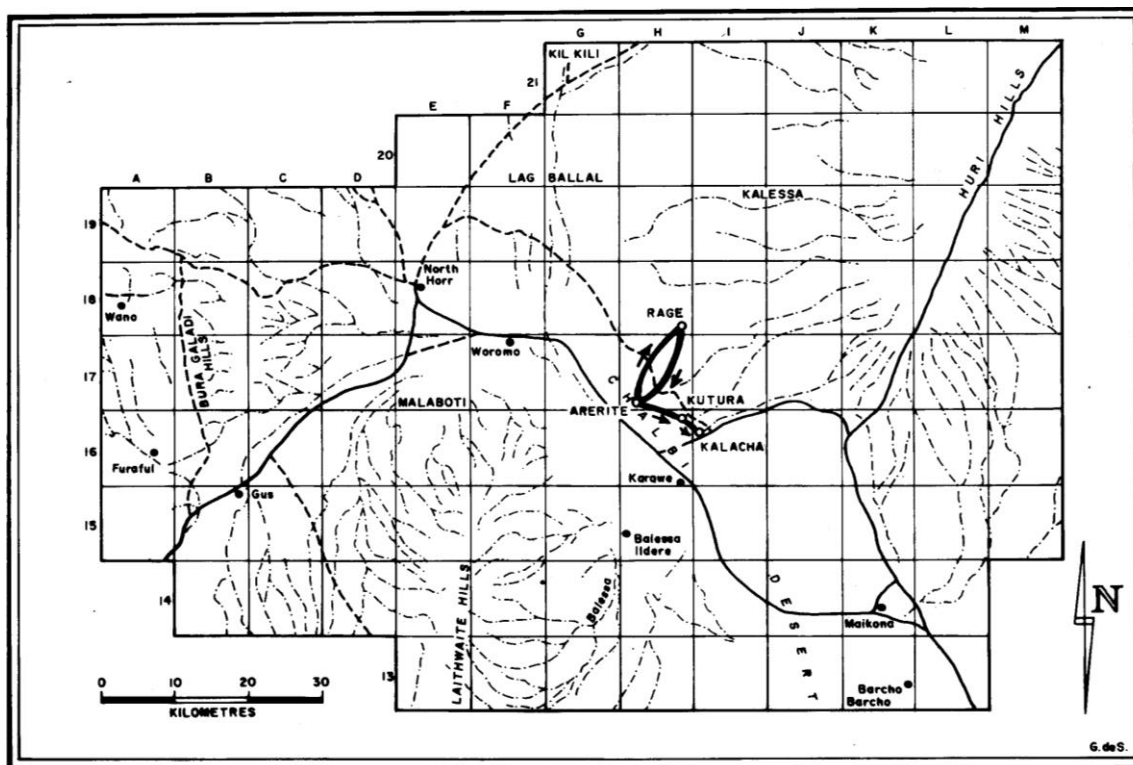


Map 2: Approximate itinerary of Galgallo's camp , April 1980 – March 1981 (each square 10x10 km)

In map 3 (next page): Dabasso was an elderly man in his sixties, with limited mobility; his youth, though, were valid to move many animals to the *fora* camps. Therefore Dabasso's camp followed a different pattern if compared to Galgallo's, during the same period. In the long rain season of 1980 they went from Arerite to Rage, covering only 12.5 km. During the long dry season, they came back to Arerite, adding other 12.5 km. From there, during the long rain season of 1981, they went to Kutura (6.5 km), to end their movement of the long dry season in Kalacha (3.25 km). Dabasso's camp (*olla*) covered only 25 km the first year and 9.75 the second.²⁴

The two Gabra patterns are completely different and connected to demography, age/health, and, above all, personal agency and decision making. During our mission we found impossible to delineate any reliable 'transhumance routes' along which arrange health facilities or mobile clinics. On the other hand, these examples are from almost 40 years ago. People and cultures change, a resultant of their resilience in the evolution of the ecosystems they inhabit. Therefore, the actual situation of routes and even of pastoralists' movement is nowadays completely different. Further research about the agglutination of people in semi-permanent settlements is a priority for next health facility planners and designers.

²⁴ Data and maps from IPAL's technical report F-3, *Economics of Pastoralism in Northern Kenya: The Rendille and the Gabra*, Part 2, by O'Leary MF; UNESCO, Nairobi 1985; Maps 3.9 and 3.10; pp.182-185.



Map 3: Approximate itinerary of Dabasso's camp, April 1980 – March 1981 (each square 10x10 km)

2.5 – MODERNITY AND RESILIENCE

At Dukana (October 16), in his closing remarks the chief says: “If I can make a generalisation, pastoralists are almost unteachable, as they cannot take in new knowledge easily. They cannot therefore change their behaviour as fast as required by your project. Their change is going to be gradual”. Like any other human group, the Gabra experience adjusting strategies to modernity. While the cultural systems provide the Gabra with sustainable and systemic ways of managing land and livestock resources, the herders are currently facing threats that may lead to their fast modification, with possible extinction as a viable, adapted economy and culture. One of the main threats is associated with the adoption of modern religious and educational systems which cause the alienation of the Gabra from their identities and places. As a result of the adoption of modern ways of life and the increasing insecurities due to the competition for land, water and pasture, the Gabra are abandoning their cultural social systems. For example, the last Jilla ceremony (generation upgrading) was held in the year 2014 and only the Gara and Galbo clans made the pilgrimage to Melbala in Ethiopia, and Forole in Kenya respectively. However, the Gara clan pilgrimage was cut short due to conflict with the Borana. The other clans, including the Sharbana, Odola, Algana and Jilbo, did not conduct their Jilla ceremony as required by the Gabra customs.²⁵ For the *gada* system of age groups, nowadays, people who cannot participate – students, workers, travellers etc. – simply receive the necessary knowledge to pass from one age-set to the other from those who acquired it during the initiation ceremony of their grade, in a form of ‘delayed instruction’.

One of the main factors that caused the rapid sedentarisation among the Gabra pastoralists is the presence, in the permanent ‘towns’, of administrative structures (education, health, police) and NGOs, all providing wage employment, public services, trade, relief food. Currently, we see that the Gabra pastoralists are no longer entirely dependent on livestock for their livelihood needs. Some families have settled, and others continue to settle because of being dropped out of the mainstream pastoral economy

²⁵ This first set of information is derived from the report of the OH mission 2018, by Kurewa AG, CCM’s assistant anthropology consultant; *op. cit.*, Ch. “Cultural environment/Human terrain”.

(based on mobility and reliance on livestock), or because of their need to diversify outside of the livestock subsector.²⁶

Even if, in the past two decades, many Gabra have established homes in permanent settlements, a significant percentage are nomadic, and livestock is still the foundation of their economy. A household's livestock-mix is typically diversified, based on dromedaries, but also including sheep, goats, donkeys and sometimes cattle. Movement of herds and households, just like the continuous fluctuation of livestock numbers, is a key part of survival in this arid region, and institutions such as those governing the use of shallow wells reflect the need for flexibility and access by a mobile population. Even those households which have established a permanent residence still rely primarily on livestock for their survival, and send some household members and their livestock to long-distance forays in search of water and pasture.²⁷ This was assessed and confirmed in almost all the settlements we visited during our mission.

Another issue relates to adaptation to climate change (see 4.4.4). Opinions over what the future holds for pastoralists are polarised. Some experts believe that pastoralists will be the first to feel the effects of climate change, whilst others (the editor among them) consider pastoralism to be an adaptation to climate change in itself and that pastoralists will therefore be amongst the best equipped to deal with it.²⁸ In Kenya, though, arid and semi-arid zones of the type we met around North Horr are managed like a problem, and not as the context where the everyday lives of people are enacted: change to modernity is considered imperative.

Change is intrinsic in any culture and environment. No eco-social system is stable, with effects – immaterial and physical – on the health status of people and ecologies. The OH projects, therefore, considers resilience enhancement as one of its goals, inside a 'components→ relationships→ innovation→ continuity' framework of pastoralists' health-seeking behaviour around North Horr.

While some types of indicators, such as those monitored by humanitarian information systems, can help to identify when the resilience of a system has been eroded, indicators of the components, relationships, and sources of innovation and continuity make clear the dynamics of how resilience is being lost. For instance, increasing numbers of Gabra are relying on food aid in permanent settlements. Indicators/surrogates based on resilience-thinking might help to make clear the dynamics of how resilience is being eroded, and not only 'lost in translation'.

In the case of the Gabra, we suggest that there is need to envision a stability domain distinct both from traditional pastoralism – whose viability is going to be undermined soon – and from the perversely resilient poverty trap that is coming to dominate. Indicators that we suggest to consider among the Gabra are camels (number per household), other types of livestock (number per household), and pasture regeneration processes (level of regrowth of certain plant species within some defined radius from permanent water). Besides those, because of the importance of mobility, cars and motorbikes (now used everywhere) should be included. Mobiles and smartphones are an essential tool in the OH project, and they are ubiquitous (a desperate elder in Durte showed us the futile four he possessed, but no way to recharge their batteries), so their diffusion and density should be counted as indicators to modernity.²⁹ What makes these kinds of indicators useful is that the variables they measure are linked to each other and create the basin of attraction that defines the system. The editor invites the OH project partners and stakeholders to envision alternative life options that bear similarities to traditional pastoralism, but also involve novel elements such as new livelihood/health sources.

Pastoral resilience is not a clear-cut domain: after a trauma, people, livestock and environments reach a differentiated level of change in their health and survival and do not 'return to the future'. Yes, resilience is defined as "the capacity of a social-ecological system to tolerate disturbance without collapsing into a

²⁶ From Kurewa AG (2018), *op. cit.*, Ch. "OR Population".

²⁷ An innovative discussion about pastoralists' resilience is in: Robinson LW and Berkes F, "Applying Resilience Thinking to Questions of Policy for Pastoralist Systems: Lessons from the Gabra of Northern Kenya", *Human Ecology*, Vol. 38, No. 3, June 2010; pp. 335-350.

²⁸ Nori M and Davies J, *Change of Wind of Wind of Change? Climate Change, Adaptation and Pastoralism*, a report prepared for the World Initiative for Sustainable Pastoralism, IUCN, Nairobi 2007; p. 6.

²⁹ We leave to the dedicated TriM's mission report to refer about communication technologies in the Project Area.

qualitatively different state that is controlled by a different set of processes”.³⁰ This capacity can also be conceived of as “the ability of the system to maintain its identity in the face of internal change and external shocks and disturbances”.³¹ But resilience depends both on elements within the system that provide continuity and memory (biological memory and social memory), and elements that bring novelty and change.

One could infer that resilience of the Gabra pastoralist system has been eroded, but we have, in the OH project, to bypass the obvious proposition that we cannot act on the inner resilience of people (enhancing what?). That means that we have to work on the outer socio-environment. The OH project management and stakeholders must design and propose a series of ‘outer resilience tools’, a kit pastoralists should have at hand when catastrophes and subsequent traumas hit their SES. We might insert in the system and enhance the efficacy of resilience tools like, among many others (in stochastic order):

- Human-animal health services combined (non-existent)
- Access to credit, money and banking
- Insurance to extreme events
- Community organised restocking inside the traditional loan system
- Livestock genetic shuffling
- Landscape and vegetation control
- Buffer fodder zones individuated and delimited
- Markets and marketing opportunities
- Quick response to climate change, with trained personnel and technological tools
- Health-related scientific knowledge and training disseminated (in schools and in permanent adult education)
- Communications and telephonic applications
- Networking with weather prediction and assistance in extreme meteorological events
- Means to explore the digital terrain and map interpretation

Yes, all these last things are somehow inside the project framework, but they are not conceived as ‘tools’ to be kept indefinitely ready and at hand: they remain ‘activities’ or ‘trainings’ in the mind-sets of the project personnel and managing staff.

Resilience, in any case, is an abstract concept referring to an emergent property of a complex system that is not directly observable. Therefore, to enhance it – without deliberately exposing pastoralists to extreme events in order to measure their reactions during and after a definite time-lap – our task is to operationalize resilience, taking it beyond the level of a metaphor. Critics³² (the editor is among them), see the common use of the word ‘resilience’ in development/humanitarian projects as:

1. A polysemic ‘umbrella’ concept (like One Health, on the other hand)
2. A vague and normative tactic
3. Another ‘buzz-word’ (like One Health)
4. A paradox for transformation (the abused ‘Theory of Change’ between pessimism and optimism)
5. A producer of *status quo* and short-duration stability
6. A key strategic and political category of today’s livelihood-design

As Sharachchandra Lélé puts it: “Resilience is turning out to be a resilient concept”.³³

³⁰ Gunderson L H, “Ecological Resilience: In Theory and Application”, *Annual Review of Ecology and Systematics*, Vol. 31, November 2000; p. 426.

³¹ Cumming G S *et al.*, “An Exploratory Framework for the Empirical Measurement of Resilience”, *Ecosystems*, Vol. 8, 2005; p. 976.

³² For a literature review of resilience and some innovative concepts, see Semplici G, *Resilience, Drylands and the Horn of Africa* (temporary title), draft of PhD thesis, Development Studies, Oxford University, 2018, with whom many here related concepts have been shared during several personal communications.

³³ Lélé S, “Resilience, sustainability, and environmentalism”, Policy Forum in *Environment and Development Economics*, 1998; p. 249.

At North Horr, November 02, Antonia Braus, veterinarian and desk officer from Berlin-based VSF-G, International Animal Health and Pastoralism section, stated: “Vaccinations increase the resilience of animals”. Where has resistance gone?



Photo 2: Pathways to modernity and resistance; on the road to Dukana (courtesy by Demarchi, TriM)

Chapter 3 – THE MISSION

3.1 – GOALS

During our mission in the North Horr sub-County we kept asking questions to individuals or very small groups; not a mistake *per se*, but far from the deep objective: building a parallel system (*Public Health*) to the force-field of health-seeking (or not-seeking) behaviours of pastoralists (*Don't ask, don't tell*). Public health has the population or community as its patient, in contrast to the individual-level focus of clinical medicine. This focus on community creates a partnership between public health and anthropology, which especially studies people in local communities. Medical anthropology focuses on health-care systems and how they function at multiple-scale levels: the individual level of patient's experience; the micro-level of physician-patient's relationship; the intermediate level of local health-care systems (health posts, clinics, hospitals) and the macro-social level of political-economic systems.³⁴

The overall goals of the October-November 2018 Anthropology-Ecology Mission were:

- a) to understand local pastoralist communities' needs, perceptions and behaviours towards human and animal health and their relations to the environment;
- b) to assess the possibility to organize future interventions aimed at integrating human and animal health services in a managed environment;
- c) to design new approaches aimed at promoting sustainable links between pastoralists and the existing Kenyan public healthcare, veterinary and environmentalist systems;
- d) experiment and validate innovative technologies for health and climate control, combining bottom-up and top-down scientific approaches.

The basic unit of study in anthropology, public health science and ecology is the population. CCM's medical-ecological approach links biomedicine with bio-cultural anthropology, contributing to understand health and disease as dynamic, adaptive, population-based processes. The socio-ecological model we followed in the mission builds on three key assumptions:

1. There are no single causes of disease; rather, disease is due to a chain of factors related to ecosystem/community/body imbalances.
2. Health and disease are part of a set of physical, biological, and cultural subsystems that continually affect one another.
3. The One Health model provides a framework for the study of health in an environmental context, but it does not intend to specify what factors maintain health within any single domain.³⁵

We have to consider the synergistic interaction of socio-cultural factors – especially local and global inequities – with the epidemiological risk factors, all inserted in a changing environment. This 'syndemic' model³⁶ provides an important intermediate tool to frame the investigation of community-level outcomes in terms of individual health-seeking behaviours, local health-providing processes, and higher level processes affecting people and their environment.

3.2 – PRIORITIES AND METHODS

Is an anthropology mission a priority for a One Health project dealing with health systems in a difficult social and physical environment? Medical anthropology is approaching the perspective of public health practice by seeking to contribute to the creation of global health systems that 'serve the people'. The goal is to balance the externalized, objective view of disease with the subjective experience of illness. The

³⁴ Hahn R A, "Anthropology and the Enhancement of Public Health Practice", in Hahn RA and Inborn M (eds.), *Anthropology in Public Health: Bridging Differences in Culture and Society*; Oxford University Press, New York 1999.

³⁵ MacQueen KM, "Anthropology in Public Health", *Encyclopedia of Public Health*, at <https://www.encyclopedia.com>.

³⁶ The concept is developed in Singer M, "AIDS and the Health Crisis of the U.S. Urban Poor: The perspective of critical medical anthropology", *Social Science and Medicine*, Vol. 39, 1994; pp. 931-948.

priority lies in the concept of the ‘sufferer’s experience’ inside the multiple layers of health and illness. In the field we followed the framework of a ‘three bodies’ metaphor:

1. The individual body constitutes the layer of lived experience;
2. the social body encompasses the way in which the individual body becomes a kind of canvas upon which environment, society, and culture are represented;
3. the politic body refers to “the regulation, surveillance, and control of bodies (individual and collective) in reproduction and sexuality, work, leisure, and sickness”.³⁷

Sickness, in this framework, is understood as a form of communication among all three bodies, like expected from the One Health approach. Anthropology, by means of descriptive, and qualitative methods, may be effective in identifying context-specific factors that contribute to health and disease outcomes. Another important methodological contribution is the use of triangulation, or the systematic application of multiple methods in order to reduce biases in situations where controlled comparison is not feasible.

The priority of the mission was to gather information in order to: a) have a bird’s view of the project area; b) contact a variety of potential beneficiaries of the OH project; c) record narratives of health-seeking behaviours and decisions in the three domains of OH; consider attitudes towards climate/environment control; d) survey vegetation zones; e) understand attitudes towards the ecosystem; f) gather baseline data. Using rapid assessment techniques, we also tried to contribute to the public health methodological toolkit.³⁸ The main tools we used during the One Health mission are typical of this approach in the field (see 3.2.1, where numbers and days for each tool are reported), leaving a great deal of liberty at questions and answers, by simply piloting the course of free two-way narratives³⁹:

- Surveys on foot (around North Horr town).
- High mobility by car on the whole Project Area, with roads used as human, animal and environmental domain transects.
- Unstructured informal interviews, in the field and in towns, of individual laypeople (men and women), public health personnel, health private practitioners, teachers and others.
- Non-scheduled informal focus group discussions (FGD) at clusters of household (*olla*) level.
- Scheduled meetings (intra-project and with local authorities at all levels).
- Structured seminars and workshops (also with TriM).
- Capacity building activities with a junior anthropologist (local), two assistants/interpreters, two drivers and other OH personnel; the editor considers this tool of the utmost importance, because it disseminates all findings and methodologies, besides creating team work and identity.

With such a toolkit, as per mandate we managed, partially or *in toto*, to:

- 1) refer to/assist the project coordinator and leading CCM and partners’ personnel;
- 2) train CCM and VSF-G personnel (plus 2 assistant/interpreters and some focal local people) about the One Health paradigm;
- 3) introduce the OH project to local authorities and all the communities and individuals we met in the field;
- 4) quickly survey all health facilities and vegetation types (human ecology tool) in the area;
- 5) gather info (in literature and in the field) about cultural backgrounds, local behaviours, practices and knowledge about health (human, animal, environmental) and climatic sensitivity (e.g., animal viscera divination for rain, ritual calendar, seasonal movements);

³⁷ Concepts elaborated from Lock M and Scheper-Hughes N, “A Critical-Interpretive Approach in Medical Anthropology: Rituals and Routines of Discipline and Dissent”, in Johnson TM and Sargent CF (eds.), *Medical Anthropology: Contemporary Theory and Method*, Praeger, New York 1990; pp. 50-51.

³⁸ Beebe J, “Basic Concepts and Techniques of Rapid Appraisal”, *Human Organization*, Vol. 54, 1995; pp. 42–51.

³⁹ From the assistant anthropologist’s report (Kurewa 2018, *op. cit.*): “Considering that structured questionnaires can be a formal and sometime too long of a process that might restrict the informants from openly and freely presenting their life stories, experiences and perceptions, the team utilised open discussions which eventually proved to be an effective method, away from the cumbersome and sometimes boring use of structured questions”.

- 6) validate feasibility and correctness of the project logical framework, as far as the local population's attitude and customs are concerned (activity with critical outputs);
- 7) facilitate and check throughout all project activities the correct methodologic and behavioural approach to local communities by all personnel, stakeholders and involved persons (activity with lightly critical outputs);
- 8) assess among the project recipients and beneficiaries (only the pastoralists included in the project area) a full understanding and diffusion of the free, prior and informed consent (FPIC) about the project objectives, timing and procedures (activity with highly critical outputs).

This sequence was not linear in time and importance and a lot of overlapping occurred during our mission, in time and space.

Besides that, during the mission the team managed to assist TriM field-researchers in their activities concerning bio-climatologic events, extreme weather events, elaboration of maps (digital terrain). We were not involved in the field activities of the vets of VSF-G, simply because there were none going on during the mission period. As a further activity, led by Gabriella Comberti, CCM's Education Expert (unpaid volunteer), the team helped in identifying and acquiring specific sets of information about science learning, validity of written materials, congruity of health representation in medical training and outreach materials, local perception of images and training tools; the activity involved one North Horr school and all health facilities.⁴⁰

Due to the fact that in Kenya schools were closed to the public the last week of October 2018 (because of final examinations) this activity was deviated towards field interviews and FGD with women about health⁴¹ (with particular reference to healthcare of children), otherwise impossible to the team because of local gender-biases (women are not supposed to talk with men alien to the family). Our field methodology was based on operational redundancy: in case some activities should be blocked for any reason, the expert is capacitated in shifting to another operational set without losing efficacy.

As a result of these activities, after considering the micro-level of physician-patient relationships – as well as the human-animal relationship of pastoralists and the medium-level of health care systems in alien settings – we identified political, social, economic and environmental factors, anthropologically relevant, that impact the way local people consider health-seeking behaviour (see Ch. 1); we reached also to a critical consideration about how physicians and veterinaries are trained and prone (or not prone) to systemic ways when community medical care is enacted in human/animal health centres.⁴² The editor considers that an anthropologist must be used, in this blurred and uncertain context, to identify biological reflections of social and environmental fault-lines.

3.2.1 – ACTIVITY NUMBERS

During the first 21 days of the mission (October 04-24, 2018), the editor (under CCM remunerated contract) and team performed eight field surveys, by car or on foot (days: October 10, 11, 13, 16, 18, 19, 21, 23); nine meeting with officials, from local authorities to school headmasters and teachers, from project management to County leaders (days: October 09, two on 12, 15, 16, 18, 20, two on 21); nineteen individual unstructured interviews (October 09, four on 10, two on 11, 13, three on 15, two on 16, two on 18, 2 on 19, 21, 24); nine focus group discussion, with men and women being separated and accounted for on the same date (October 10, 12, two on 15, 16, 21, 23, two on 24); participated in an Educational exercise (October 23) and led a training seminar on One Health (October 24).

During the rest of the mission (October 25-November 10, 2018), the editor was an unpaid volunteer for CCM, performing with the team six more field surveys, by car or on foot (October 27, 28, 29, November 02, 03, 04); eight meetings/workshops (October 28, 29, November 01, 02, 03, 05, 08, 10); five individual

⁴⁰ For details, see Comberti G, Sijui kuchora, *I don't know how to draw. Image perception of One Health in schools and health facilities in the sub-County of North Horr*, CCM, Torino, February 2019.

⁴¹ Comberti G and Shamo T, *Our children live with animals, drink their milk and eat their meat: they are healthy. The voice of women in a One Health project*, CCM, Torino, February 2019.

⁴² Regarding physicians, see Konner M, *Medicine at the Crossroads: The Crisis in Health Care*, Pantheon Books, New York 1993.

interviews (October 31, November 02, 03, 04, 06); six focus group discussions (October 28, two on 29, November 02, two on 04).

A preliminary activity was the introduction to the relevant local authorities, whenever and wherever available, considering the fact that, during the period of the mission, the OH project had not been officially launched yet.

We introduced the project to some area chiefs (appointed by GoK) in Gas/Gallas, Dukana, Eel Hadi, Eel Beso; on October 09, we paid a visit to the Assistant County Commissioner at DDC's office in North Horr: target zone and questioning methodologies illustrated and approved; on Saturday, October 10, for the Mashujaa Public Holiday⁴³ we joined the North Horr *baraza*⁴⁴, where the project coordinator, Anthony Odhiambo, participated with an introductory speech about One Health in the sub-County and our team interpreter/assistant opened the ceremony with a prayer; identified attendant officers were: Deputy and Assistant County Commissioners (GoK); Officer Commanding Police Department; Officer Commanding Station; Deputy Administration Police Commander; Chief Officer for Livestock and Agriculture, Marsabit County; Senior Chief and Assistant Chiefs; religious leaders; elders. At the end of the President's speech, read by the DCC of North Horr and concluding the ceremony, the OH team was introduced to the officials and invited for lunch, that we willingly attended, building good relationships with the local authorities.

A subsidiary activity was the participation to an exercise in a North Horr primary school (October 23) about One Health perception in science curricula, combined with the assistance to the Education Expert in assessing the visual/cultural validity of training/information charts used inside health facilities and during outreach activities (in all visited health facilities of the PA).

The editor and team assisted the technical mission by TriM (partner of the project) in their field operations (October 28 and 29, November 02, 03 and 04) and training workshops (November 05 and 06).

Considering it a specific activity, during the whole mission the editor and team took daily field notes and communally elaborated a subsequent document ("North Horr Field Notes AET"), available c/o CCM and OH project management in Nairobi. In the document all activities were duly reported and described in detail. This day-by-day capacity-building proved particularly effective with the Anthropology-Ecology team and accessory personnel.

The first field data and anthropology-ecology analyses were disseminated by the editor during the CCM's "International Workshop on One Health", in Turin, Italy, November 13, 2018.

3.3 – PROJECT AREA

North Horr sub-County has a total land mass of 39248 km². It borders the Ethiopian frontier to the North, Lake Turkana to the west, Laisamis sub-County to the south, Moyale sub-County to the east, Marsabit Central to the south-east and Marsabit North (Chalbi) sub-County to the east-south-east.

The first operation during the mission was to define the limits of the Socio-Health System the project intends to move into. A system is a set of components that are connected with a specific form of organisation; they are able to reciprocally influence one another by feedback, inside an arbitrary border. In defining the area, we tried to use coherent criteria with the nomadic life of long- and short-range pastoralists and the existing health system in the North Horr sub-County. Logistics were also considered, due to the harsh terrain of the area.

Thereafter, seven main locations were selected in the central part of the sub-County area: North Horr (main project-base) with a Health Centre, level 3 for the Kenyan health-facility typology; Malabot, with a Dispensary, level 2; Gas/Gallas, with a dispensary, level 2; Kalacha, with a Referral Hospital, level 4; Balesa, with a dispensary, level 2; Eel Hadi, with a dispensary, level 2; Dukana, with a Health Centre, level 3; level 1 is a single Community Health Volunteer, while level 5 is the main hospital in Marsabit. Theoretically, Gas/Gallas⁴⁵, Eel Hadi and Dukana pose problems because they are trans-border, at sub-County and

⁴³ The 'Heroes & Heroines Day', to remember the freedom fighters for the independence of Kenya (1963).

⁴⁴ Official public meeting and assembly place.

⁴⁵ This small town lies on the border of the North Horr sub-County: being divided in two halves (one Rendille and one Gabra respectively), it has two names; GPS position taken by TriM confirmed that the dispensary is inside the North

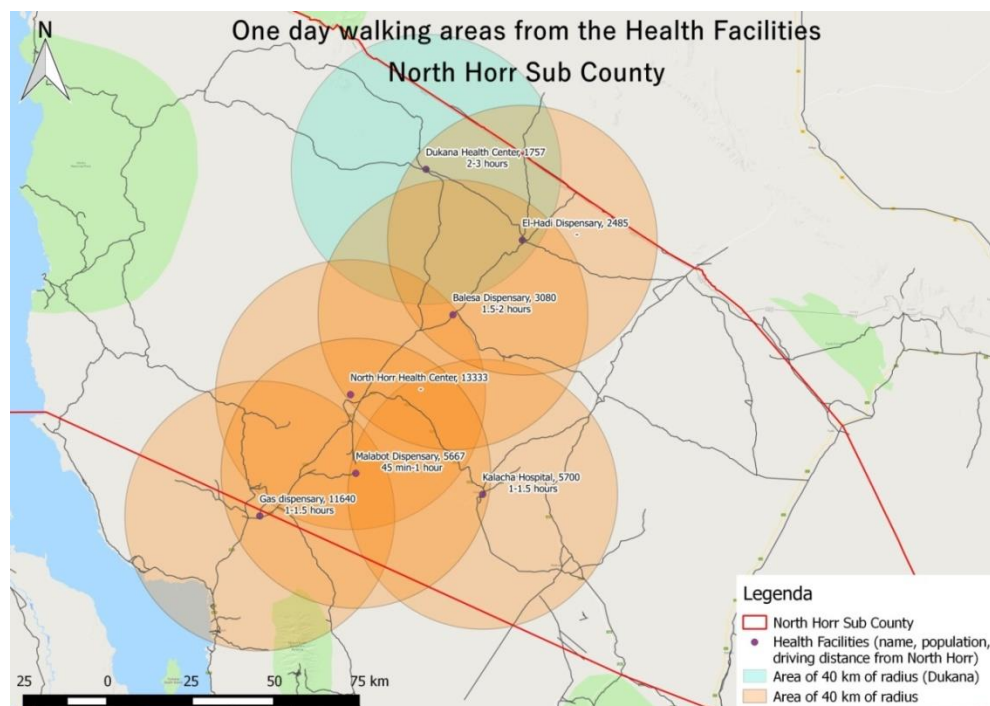
international level, but the Project Manager, with due precautions, considered this an asset for future interventions regarding the health of pastoralists, whose economy and culture cannot be strictly bound to borders.

The demography of the PA is complex. According to the 2009 census data, the North Horr sub-County has an average density of 1.1 inhabitants/km². Within the PA, the demography of the selected locations (see Table 2) is surprising: males account for 55% and females for 45% of the total population. Males exceed women by far throughout all locations, with high percentages in the M/F ratio in Gas/Gallas and Eel Hadi. For that, we might consider gender biases by Gabra pastoralists in exposing women to census, but this demographic discrepancy must be properly investigated.

LOCATION	MALE	FEMALE	TOTAL
North Horr	6597	5560	12157
Kalacha	4181	3783	7964
Dukana	4152	3845	7997
Gas/Gallas	3139	1921	5060
Balesa	1922	1874	3796
Eel Hadi	1549	936	2485
Malabot	942	815	1757
TOTAL	22482	18734	41216

Table 2: Demography of OH project main localities in North Horr sub-County (source: Kenya National Census 2009)⁴⁶

In terms of age brackets, the highest number of persons fell under 15 years of age category, while the lowest number is for the under 1-year category (see photo 8 for details). Based on this estimated demography, the total number of households can be estimated at more than 15,000, with a range from 5 to 6 people per household.



Map. 4: the Project Area with catchment zones of 40-km-radius around the 7 main health facilities (by DIST)

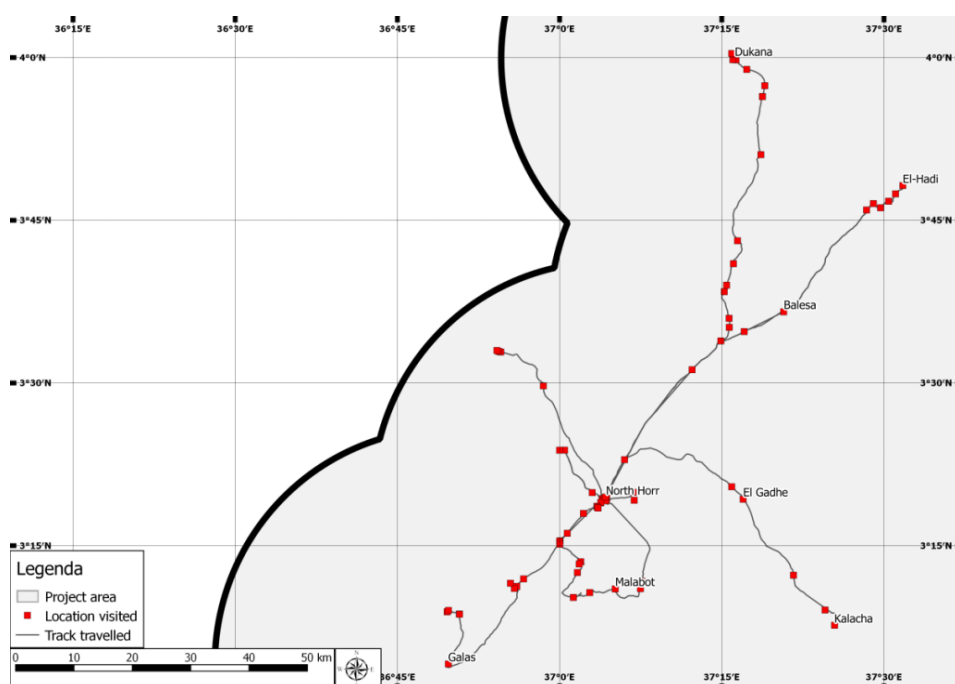
Horr sub-County boundaries; in any case, we maintain the double denomination because even the Gabra we met use Gas more than Gallas.

⁴⁶ As reported by Kurewa AG (2018), *op. cit.*

From all PA locations – foci of the project’s intervention – we designed hypothetical health-catchment zones with a radius of 40 km, a distance a pastoralist can cover in a day (see map 4). Even considering the heavy overlapping of some catchment zones, around North Horr distance is a crucial factor for health-seeking behaviours. This was confirmed by several interviews during our mission: e.g. by North Horr elder Ibrae Jillo, October 13 [“Health centres are of little utility, because there is a chain of importance, from dispensary to better equipped hospitals, for instance from Gas to Marsabit up to Nairobi: this makes the journey of the sick persons long and costly, with no certainty of being healed in the long run.”]; or by Isac Bett, nurse at Dukana Health Centre, October 16 [“For us medics it is difficult to get to the outreach locations: consider that 20 days in a month are spent on this activity; it is impossible for pastoralists to leave their livestock without assistance: distance from health facilities is the key, just like some lack of knowledge is a hindrance”]; and Pauline, nurse at the Balesa dispensary, October 18 [“I notice a poor health-seeking behaviour, since most people are far from the facility; therefore only the nearest people make use of our services, even if the staff goes 4 days in a month for outreach activities among distant communities”]; or Safia Abduba, October 19 [“Only the persons near the health facility refer to it because of the distance: a woman died out of a scorpion sting because she did not come to the dispensary to cure it, and eventually she died”]; she is the nurse in charge at Eel Gade dispensary, near the Kalacha Hospital, where the same situation was confirmed by its administrator Mr. Rotich.

In most pastoral communities, sick persons are geographically (distance) and environmentally (accessibility) triaged: light cases never refer to health facilities, because it would be a loss of time (subtracted to the pastoral economy) and resources (economically heavy: if it might be true that poverty enhances risks of disease, but certainly diseases can lead to poverty); severe cases follow the same rules: the idea is that they will never make it to the nearest hospital capable to effectively cure them; so, in the data collected at the health facilities, we tend to have only medium-severity cases. Distance from/to health facilities becomes a live-or-die triage system, valid both for people and livestock.

The mission managed first thing to visit all the focal sites in the project area, plus a number of satellite centres, with minor health facilities (Eel Gade and Eel Beso) or without (many clustered *olla*, or semi-temporary settlements, along the roads – used as transects – or close to North Horr, see map 5). This activity was meant to definitely delineate the project’s boundaries and beneficiaries.



Map 5: Waypoints/tracks reached by the mission; the black line shows the 40 km catchment limit of PA (by TriM)⁴⁷

⁴⁷ During the AET mission we used a Montana 680 Garmin GPS to take tracks and waypoints (time, longitude, latitude and elevation registered; for details, see the TriM’s file [data_gpx_salza] attached with the Field Notes, c/o CCM. For other geographical information and features of the PA, see other maps from TriM.

An anthropological observation must be emphasized: the selected Project Area (PA) is at the centre of the North Horr sub-County following an ideal south-north line from Gas/Gallas to Eel Hadi-Dukana, with North Horr town as its epicentre; therefore, the PA has an homogeneous population, the Gabra pastoralists, with few demographic insertions in the major centres. In the whole sub-County the ethnic composition is more complex, with Daasanach (also 'Shangilla', traditional enemies of the Gabra) around Ileret; El Molo, Samburu, Turkana and others around Loiyangalani; while Rendille occupy most of the south-eastern land of the sub-County (Kargi, Korr), with Borana enclaves; in the Gabra areas live also the Watta, a relic population of former hunter-gatherers, plus many passers-by, included Somali and Ethiopians of various origin. The anthropological implicit danger inside the PA is to 'tribalise' the OH project, giving it an excluding Gabra connotation, thus raising discontent among the other socio-cultural groups, who are going to fear being cut off its benefits.⁴⁸ In these territories, projects are economic and political assets; therefore, this report never refers to the project as a 'Gabra-related' social or health activity.

3.4 – LANDSCAPE

A territory is an ecosystem inhabited by people. If throughout the world this anthropic insertion produces deep modifications in the landscape, inside the PA the human impact appears to be minimum on landforms and soils: pastoralists neither cultivate nor 'move mountains'. Their only changes of the semi-desert landscape are pathways and mobile huts. Following a 'pathway model', during our mission we used the road as an 'ecology transect', identifying features that might involve or determinate action by pastoralists and exploitation by livestock. This method provided extensive qualitative and some quantitative information.

Most of our mission towards north and Dukana moved through an extended plateau (average elevation: 650 m ASL) of rocks of volcanic origin (see map 6) cut by the valley of river Balal, dry most of the time but prone to killing floods if rains fall in Ethiopia; its sudden fury is feared by pastoralists and drivers alike. Towards north-east, up to Balesa and Eel Hadi, the road borders an escarpment between the lava plateau and the volcanic deposits down an elevation shift. This feature is marked by the Bilchabis temporary river, who feeds the Balal south of Balesa. The divide between plateau and foot ridges is clear-cut, and made the fortune of locations like Eel Hadi and Balesa, where the water-table is high at the escarpment base (although Balesa means 'well with little water'). Likewise it happens at the foot of Kulal volcano, where the interface between two different lava bedrocks seeps water, somewhere flowing in very short permanent courses. As far as pastoralists' human ecology is concerned, we understood that 75% of the Dukana territory (estimated 2060 km²) has severe temporary restrictions to access by livestock due to flood and mud formation, while rainfall is estimated between 150 and 300 mm per year.⁴⁹

This zone borders at south the North Horr eco-zone (about 2250 km², at an average elevation of 380 m ASL), where approximately 10% of the territory has severe temporary restriction to access by livestock due to flooding. Landforms are essentially piedmont and dried lacustrine plains, on stratified sandy loam, very deep. Because of that, water (sweet or brackish) is available from the shallow table throughout the year, if no extreme climatic events occur.

Towards Kalacha⁵⁰ (an area of about 4240 km² at an average elevation of about 400 m), in south-eastern direction, the road follows the border between the plains of undifferentiated volcanic rock (at north-east) and the lake deposits that open to the Chalbi desert, a dried lake, at west-south-west.⁵¹ On foot-slopes and

⁴⁸ About the "factual" history of the Gabra, see Schlee G, *Ethnopolitics and the Origins of Gabra*, Max Planck Institute for Social Anthropology, Working Paper N° 103, Halle/Saale 2008.

⁴⁹ Schwartz HJ and Walsh M, "Range Unit Inventory", in *Range Management Handbook of Kenya, Volume II, 1 Marsabit*, GTZ-Ministry of Livestock Development of Kenya, Nairobi 1991, p. 87.

⁵⁰ *Kalacha* means 'straight'; this may allude to the Borana ornament of the same name, which is an aluminium phallic (*kallacha* or 'erected') ornament extruding from the Borana elders' foreheads.

⁵¹ The Chalbi basin covers 948 km², lies between 435-500 m in elevation ASL, forming the largest water drainage system in the area.

Vegetation Index	Color
LV1	Light Green
LV2	Dark Green
BV	Blue
YP	Yellow
UP	Orange
VC	Purple
PI1	Light Blue
PI2	Dark Blue
YV1	Light Green
YV2	Dark Green
FV1	Light Green
FV2	Dark Green
FV3	Light Green
La	Light Green
Pi3	Light Green
Ly2	Light Green
Gallas	Light Green

A ZONAL TYPES (MAINLY CLIMATIC)

1	Forest
2	Woodland
3	Perennial Grassland (derived from Woodland or Forest)
4	Evergreen to semi-deciduous Bushland with Perennial Grassland
5	Deciduous Bushland
6	5.1 Thickets (over 80% cover) 5.2 Open
7	Deciduous Shrubland
8	6.1 Thickets (over 80% cover) 6.2 Open
9	7.1 Mallee (over 80% cover) 7.2 Mallee (over 80% cover) 7.3 Mallee (over 80% cover) 7.4 With perennial grasses
10	Dwarf Shrub - annual Grassland (trees and shrubs less than 1% cover)
11	Barren lands
12	9.1 With dwarf shrubs on drainage lines 9.2 With annual grasses (Aristida/Themopteron complex)

B. EDAPHIC TYPES

1	Riverine Woodland
2	Woodland to Grassland on seasonal waterlogged soils
3	Bushland to Grassland on Saline soils

Legend

- Project area
- Location visited
- Track travelled

0 10 20 30 40 50 km

3°15'N 3°30'N 3°45'N 4°0'N

37°0'E 37°15'E 37°30'E 37°45'E

Map showing vegetation types (1-12) and edaphic types (1-12) across the study area. The map includes a scale bar (0-50 km) and a north arrow. The legend defines 12 zonal types (1-12) and 12 edaphic types (1-12). The map shows various vegetation types (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) and edaphic types (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) across the study area. The map also shows the location of the study area (Horn of Africa) and the location of the study area (Horn of Africa).

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Towards Gas/Gallas (south-west of North Horr, elevation of 470 m ASL) the road cuts through lacustrine deposits, a flat alluvium plain of mixed volcanic rocks and lake-bed deposits, to eventually reach the escarpment above the lake Turkana, made up of volcanic deposits from Mt. Kulal.

All these landscapes look barren and hostile, but that is the environment where pastoralists move their livestock in search of pasture: they perceive this habitat as simply 'difficult', otherwise they would try to change it or go away. Etymologically, 'desert' means 'abandoned'.

Regarding the plant environment, the eco-zone around Dukana has forage availability over 25% of the area, limited to the rainy seasons; considering vegetation, about 60% is barren land, 15% deciduous shrub-land, 10% dwarf-shrub/annual grassland, 10% bushed grass-land, 5% deciduous bush (see map 7). At our first look, herb-layer quality deteriorates rapidly after the rains and becomes unsuitable as ruminant feed during dry spells. Anyway, we must consider the fact that we moved in the landscape at the very end of a 'normal' dry season.

In the North Horr eco-zone, 50% of the territory is barren land with dwarf-shrub/annual grassland; 30% is bushland to grassland on saline soils; 10% riverine woodland; 10% deciduous shrub-land. More than half of the area is barren with narrow vegetation bands of dwarf shrubs (a typology known to the Gabra as *kurkur*, with *Indigofera spinosa*, named *kiltippe*, as the dominant species) and annual grass along drainage lines and in shallow depressions only. Forage availability over the rest of the area is limited during rainy seasons and immediate post-rain periods. Forage quality deteriorates very quickly, pushing herds to long-range mobility.⁵⁴ Small areas of riverine woodlands (where water is available in the hand-dug wells of the *lagga*) are used in dry seasons as a reserve for the limited number of livestock necessary to feed the settled families, composed mainly of old people and women with children.

The Kalacha eco-zone sees 10% of the area as barren land. Forage availability on the rest is limited to rainy seasons and immediate post-rain periods. Forage quality of herbs deteriorates very quickly afterwards and becomes unsuitable as ruminant feed. The high water table, anyway, permits the life of an open vegetation association *Commiphora-Acacia* of various species (mainly *A. mellifera* and *reficiens*, with *tortilis* in the dry river-beds, where its root can reach the sub-alvear flow).

Going to Gas we crossed flat alluvial plains with very low vegetation cover by *Indigofera spinosa* (*kiltippe*). The eco-zone is referred to in Gabra as *dhiid sirib*, flat place of mirages.

At the limits of the Chalbi eco-zone, the top vegetation is the salty desert-resistant shrub *d'urte* (*Suaeda monoica*)⁵⁵ utilized around North Horr by camels during droughts or ceremonial meetings like *sorio*, when all livestock must be brought together for being blessed. Without this eco-zone, around North Horr the multitude of livestock might lead to rapid deterioration and overgrazing of any vegetation.



Photo 3: Into the wind, looking for pastures (courtesy by Demarchi, Trim)

⁵³ Based on the Map 17 "Vegetation", by GTZ-Ministry of Livestock Development (Nairobi 1988), *op. cit.*

⁵⁴ *Ibidem*, p. 84.

⁵⁵ For the identification of Gabra plant names, we followed the highly detailed "Botanical Glossary" in Tablino P, *op. cit.*, pp. 339-346.

Chapter 4 – ONE HEALTH ON THE GROUND

4.1 – A HEALTHFUL FIREPLACE

The elders of Dukana gather in their communal hut on October 16, 2018, because the area chief wants to know about the One Health project we are starting to implement. After greetings and introduction, I ask which the pastoralists prefer most, if the health of animals, of humans or of the environment. They look at me as if I were an idiot. After some embarrassed silence, the perception by the whole Anthropology-Ecology team is that pastoralists are well aware of the systemic relationships at the base of the One Health concept: indeed, it was derived by bio-medical scientists from their way of life.⁵⁶

In all occasions and locations we introduced the project to authorities and/or pastoralists inside the PA, we illustrated the spiralling One Health concept: healthy people → healthy animals → healthy environment → healthier people and so on. The cycle appeared obvious to all pastoralists. Under suggestion by Guyo Hama, teacher at the North Horr Primary School, we utilised a simple introductory metaphor: One Health is like the three stones of the cooking fireplace (ubiquitous in Africa: see our story in Appendix A): without one of the stones, the whole structure crumbles and becomes useless.

Beware: pastoralists care for their health (up to a certain extent, as we understood) and that of livestock (an imperative), but they are not conservative environmentalists. They exploit the environment, whatever its health-condition is and however pejorative their actions might be. For the Gabra, to live in balance with a trying environment is to protect land, livestock, and fellow Gabra. Thus, they practice certain food and plant taboos, preserve full-grown trees called *korma* ('bulls', in the 'livestock universe' of the herder), prohibit to cut down trees or kill any wildlife within the Jilla ceremony locations, and revere pregnant women and pregnant animals. But they are ready to get rid of environmental competitors like wild herbivores and predators.

On October 10, we stop at Eel Boru Magado. We interview Barile ('Dawn') Guyo, 70 years old. Barile has been living here 30 years, coming from Eel Gade, near Kalacha: he was looking for better pasture. His animals are sent to graze as far as Sibiloi, Mt. Kulal, Chariashe Hill, Moite (on the shore of Lake Turkana) and Sabarei. He says; "50 years ago there were leopards, giraffes, antelopes, all killed by drought". He is cautious to admit hunting. When asked why the domesticated animals survived, he answers: "Humans help domesticated animals to stay alive, while wild animals have no one looking after them". "Trees are protected by the government now", he continues, "so we have to get an official permission or to hide our 'wedding tree'. According to tradition, an acacia tree that has not been cut before is used for the construction of the newly wedded couple's house. It's a must. So we cut".

In North Horr, October 12, Salesa Guyo, 74 years old, points out that 50 years ago in Gabraland and around town there were many wild animals, like buffalo (especially in Hori Dika and Wormo), giraffe, zebra and so on, with lions eating camels and cattle just near North Horr. "Now all wild animals disappeared because of droughts, but Gabra like me used to hunt them with dogs and spears".

If pastoralists are not the 'custodians of the environment' of some adulterated narrative, they are not destroyers either. Pastoralists are often accused of overusing their ecosystem. Typically, livestock are considered responsible for overgrazing and plant destruction. This is not a definitive datum: in northern Kenya, where land is unsuitable for agriculture, research showed years ago that – without nomads and their livestock – these lands would tend to desert, and not *vice versa*.⁵⁷

These fine-grained accounts – and some micro-scale surveys by our field mission inside the PA – showed a dependence of the 'environment health' from the pastoralist's agency and culture, totally livestock-oriented. One of the three stones is thereafter unbalanced, just like it is within the project framework, where no environmental personnel is envisaged at the moment, and the environmental sector is reduced

⁵⁶ The concept of 'One Medicine', antecedent and preparatory to One Health, was developed in Schwabe CW, *Veterinary Medicine and Human Health*, Williams & Wilkins, Baltimore 1984.

⁵⁷ Ellis J and Swift DM, "Stability of African pastoral ecosystems: Alternate paradigms and implications for development", *Journal of Range Management*, Vol. 41(6), November 1988; pp. 450-459; see also Swift J (ed.), *Pastoralism and mobility in the drylands. The Global Drylands Imperative*, Challenge Paper, UNDP, 2003.

to extreme weather-event prediction (connected or not with the climate change issue) and some mapping of water/vegetation resources.

According to the editor's critical view, the One Health paradigm does not operationally work at lower scales when extracted from the narrative by the current forms of global health governance (GHG). Kelley Lee and Zabrina Brumme write:

Despite its great potential to strengthen collective action across sectors, operationalization of the One Health approach has been hindered by dysfunctions and shortcomings in how its agenda has been articulated to date. An agreed operational definition of One Health among key global institutions⁵⁸, efforts to build One Health institutions from the ground up, 'implementation science' case studies of what works or does not work institutionally, and high-level global support for research and training, are among many factors necessary to strengthen the initiative into one capable of catalyzing change in GHG. While there has been wide-ranging commitment to the One Health approach, its operationalisation has so far proven challenging.⁵⁹

One Health is defined as a collaborative, multi-sectoral, and trans-disciplinary approach — working at the local, regional, national, and global levels — with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment. The OH concept recognizes that the health of people is connected by interface to the health of animals and environments. This approach should involve physicians, veterinarians, ecologists, and many others to monitor and control public health threats and to learn about how diseases spread among people, animals, and their environment.⁶⁰ According to biomedical health sciences, OH needs to interact with all scholarly pursuits related to social systems, like sociology, economy, political sciences, anthropology and religion, interacting with ecology, geography and all environment-related sciences. All these processes span across scales, from molecules to populations. The interactions of people, animals and the environment are not straightforward. They are part of human-environment systems (Social-Ecological Systems, SES). SES are complex, multivariable, nonlinear, cross-scale: and changing.⁶¹

The OH approach to research provides an opportunity for enhanced understanding of a range of health impacts and solutions. In 2015, the World Health Organization (WHO) designated 11 diseases as high risk for severe outbreak, ten of which have a zoonotic reservoir or transmission vector.⁶² This makes One Health a response to emergency, in the etymological sense. Jill Lebov *et al.* write:

A OH approach to studying these diseases may be able to provide more complete information about opportunities for outbreak prevention than a traditional one-dimensional approach. For example, a Lassa fever prevention intervention which targets the environmental (e.g. improved household sanitation) and animal (e.g. rodent removal) domains may show promise, but omission of the human domain (e.g. education of nurses on disposal of contaminated material in hospitals) may result in a missed opportunity to achieve optimum results. At worst, siloed approaches may lead to unforeseen detrimental effects. In the Lassa fever example, removal of rodent populations may result in increased malnutrition among humans if rodents were a significant direct or indirect (*i.e.* prey for larger food source animals) source of protein for families living in affected communities.⁶³

⁵⁸ The WHO's definition is highly insufficient: "One Health is an approach to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes. The areas of work in which a OH approach is particularly relevant include food safety, the control of zoonoses [...] and combatting antibiotic resistance. Many of the same microbes infect animals and humans, as they share the eco-systems they live in. Efforts by just one sector cannot prevent or eliminate the problem"; see <https://www.who.int/features/qa/one-health/en/>, lastly retrieved in January 2019.

⁵⁹ Lee K and Brumme ZL, "Operationalizing the One Health approach: the global governance challenges", *Health Policy and Planning*; Vol. 28, 2013; pp. 778–785.

⁶⁰ U.S. Centres for Disease Control and Prevention in <https://www.cdc.gov/onehealth/basics/index.html>, lastly retrieved on January 2019.

⁶¹ Zinsstag J *et al.*, *One Health. The Theory and Practice of Integrated Health Approaches*, CABI, Wallingford UK 2015; pp. 21-22.

⁶² WHO 2015, at <https://www.who.int/medicines/ebola-treatment/WHO-list-of-top-emerging-diseases/en/>, lastly retrieved on January 2019.

⁶³ Lebov J *et al.*, "A framework for One Health research", Elsevier, *One Health*, June 2017, p. 44-50.

One Health cannot be considered a sum of three elements; it is a quantum leap of complexity involving three domains, the vector-product of human, animal and environmental health combined. In the field, the editor used a metaphor to explain the concept of complexity. He verbalised tea-preparation in form of a story (see Appendix A). Summing up: you have tea leaves, water and sugar. To obtain tea, though, you need an immaterial element: heat (energy). The material elements of OH are the three 'healths', while the immaterial one is the pastoralists' culture and attitude towards health, their resistance attitude and resilience potential: the operators that build any successful health system. After boiling and brewing, tea is ready: now try to divide tea leaves and sugar from hot water (now coloured), or any other combination of elements! No way: tea is the end-state of a systemic transformation and entanglement, irreversible and inextricable.

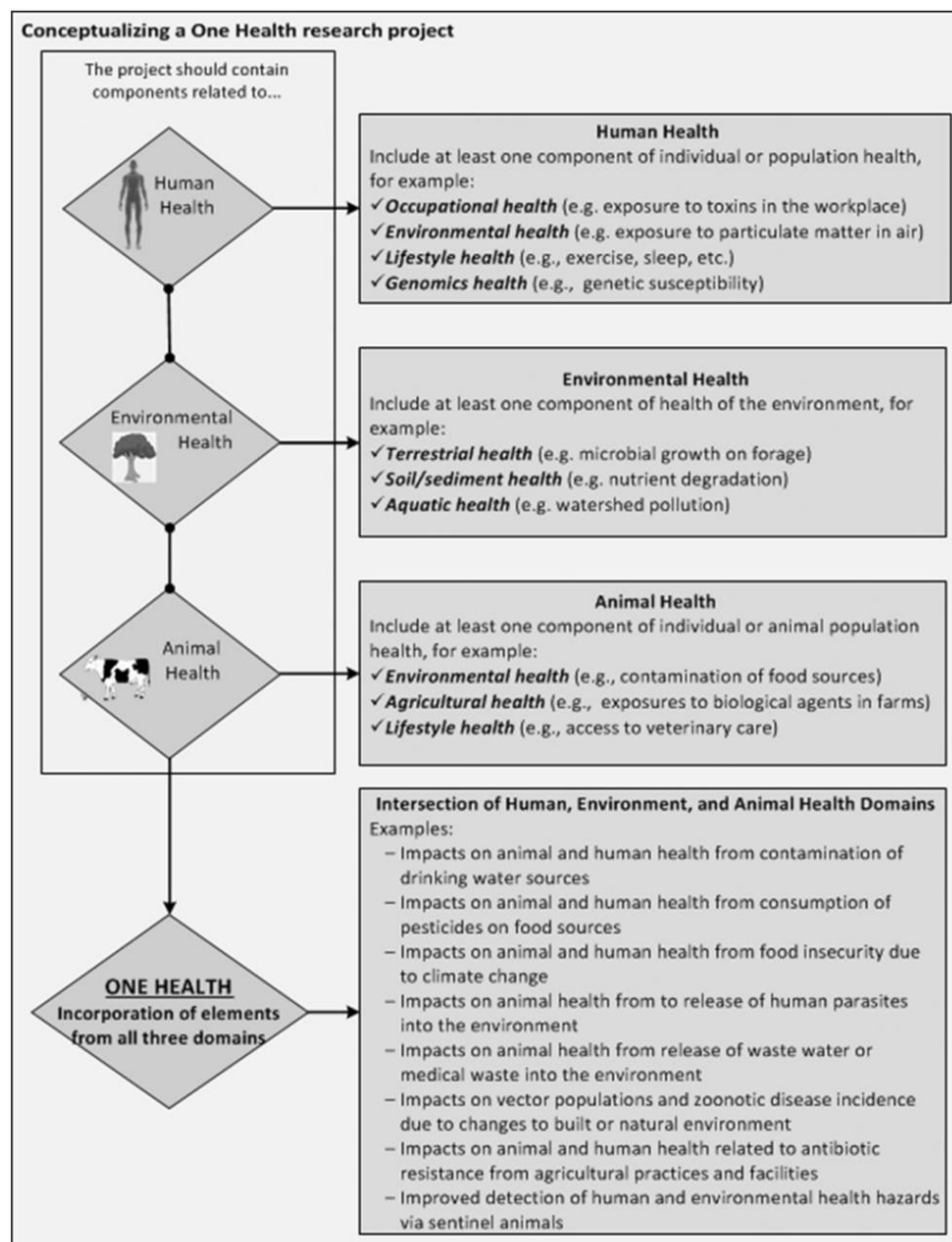


Figure 1: Concepts to a One Health Research⁶⁴

⁶⁴ Source: Lebov *et al.*, *op. cit.*, p. 46.

4.1.1 – REMARKS AND SUGGESTIONS

During our mission, we had evidence that, if medical doctors consider the object of OH only any form of zoonosis, the veterinaries follow up (but they are more community-based and prone to listening to pastoralists), while environmental experts are utterly absent in the project framework, if not for climate/weather issues. In all cases, the meta-science of anthropology is not a panacea for a correct One Health approach. That was evident during a seminar that the editor – anthropologist and human ecologist – held in North Horr, October 24, attended by all available OH project personnel and VSF-G elements, these voluntarily participating (for contents, see Appendix C). Somehow, the attendants remained of the opinion that One Health is a sum of competences ($1+1+1=3$), and not a multi-dimensional product ($1 \times 1 \times 1=1$).

Though many scholarly publications describe the benefits of the OH approach, additional guidance for operationalizing the OH approach during the early phase of the OH design is needed. To successfully develop a research project and its following analysis using a OH approach, investigators must consider incorporating elements from human, animal, and environmental health and the multiple intersections between each of these, at any moment of the process. An illustration of this framework is in Fig. 1, suggesting to have at least two elements of the model combined at any stage of research.

Even this approximating adjustment – already suggested by the editor to the OH project management for future trainings – is not theoretically valid, and it may impede proper understanding of One Health: if all the elements are not considered as a system at the same time and scale, the OH paradigm does not hold valid.

The variegated positions of Community Health Volunteers (CHV, human health) and Animal Disease Reporters (ADR, animal health)⁶⁵ at the moment operating in the PA – the primary target for OH training – must be reconsidered. In the project framework the number of the OH-trained community operators is supposed to be 30+30, selected at community level among the already operative volunteers and reporters. CHV and ADR are supposed to work together, but this goes against their differential distribution and tasks in the same community, but inside different domains. Why keeping separate human and animal health if we are dealing with a OH approach? Where is the environment-dedicated personnel?

A OH project's Community Health Supervisor (November 01) stated that he could not understand the reasons behind the ongoing division of CHV and ADR inside the project framework: why not training an altogether new figure, with full tripartite OH concept implemented? This would build an effective OH operational team in the territory. Furthermore, it is probable that the selection is going to create problems of envy and resentment among the discarded ones: even an extra training is an asset among the settling pastoralists, who can market it when looking for a job in an NGO. Opposing this, we are informed that there is no possibility to interfere with the health system of the County and its operators at community level.

The editor suggests that this may be acceptable now, but the project management has ample time to introduce this issue to the health authorities, planning to organise their system around the One Health approach. In order to redress the unbalanced framework inside the OH project, the editor prepared a concept-paper, suggesting the insertion of two environmental community figures, 'spotters' and 'stringers'⁶⁶ (see Appendix B), who would fill the asymmetrical gap opened by the absence of the OH environmental component (weather and climate excluded).

All in all, the OH concept looks to the editor like undefined and misunderstood, if not utterly ineffective on the ground; this situation is quite difficult to redress only by training: who shall appropriately train the trainers? As suggested by Joshua S. Yang: "As emerging diseases and health priorities evolve into global and multi-sectoral issues, public health professionals – from interventionists to advocates to researchers – must step outside of their silos".⁶⁷

⁶⁵ To avoid confusion (health vs. disease, without distinction human-animal), we suggest to use the denomination Animal Disease Reporters (ADR) instead of Community Disease Reporters (CDR), utilised in the project framework.

⁶⁶ In the proposal, the spotter identifies the environmental health problems in the field, while the stringer elaborates primary and secondary data for an appropriate OH operationalisation; spotters can be uneducated pastoralists, while stringers need scientific training.

⁶⁷ Yang JS, "Moving beyond traditional boundaries: Public health and multi-sectoral integration", *Californian Journal of Health Promotion*, Vol. 9, Issue 1, 2011; p. v.

4.2 – HUMAN HEALTH

Anthropologists, epidemiologists and public health authorities, if combined, may approach key social and cultural concepts relevant to health and disease, including culture change and stress; social stratification; risk vulnerability; health-seeking and -managing behaviour; sickness/illness constructs. After the intersection of the two disciplines, a 'cultural epidemiology' might provide public health systems with cross-cultural analyses of the distribution and determinants of disease/illness and with variables (e.g., population, class, religion, time, other) to illustrate and specify their theoretical context and meaning.⁶⁸ By listening to the 'sufferers', anthropologists may manage to go near some form of understanding of the root-causes of public health's toughest problems. And respond with action.

Warning by the editor: keeping in mind the criticism about the separation of the OH components, hereafter we operate such a tripartite subdivision only for easy-reading sake and operational over-simplification.

4.2.1 – SUFFERER'S EXPERIENCE: VOICES FROM THE FIELD

Hereafter we report in time-order some relevant opinions about human health, as expressed to our team in the field, at household level, by pastoralists, men (M) and women (F).

At Eel Isaaqo Malla (October 10), Guyo ('Sunset') Yattani (M), aged 61: "When sick, we refer to Malabot, which is 18 km away; this dispensary is cheaper than North Horr Health Centre. As far as I know, around here the most prevalent human diseases are malaria (*kando*), common cold, vomiting, pneumonia".

At Eel Boru Magado (October 10), Barile ('Dawn') Guyo (M), aged 70: "Usually we refer to Gas/Gallas dispensary, at a distance of two-hour walk. But today a woman, who just delivered, had breast problems. We preferred to send someone on the motorbike to seek for treatment from the Malabot dispensary [reason unstated], at my expenses because I'm the *aba olla*. Human diseases? I'd say malaria and common cold".

At Barambate (October 10), Wario ('Early night') Abutho (M), aged 67: "We have malaria when it is raining, but no cases in this *olla*. Everywhere there is diarrhoea, even if our water comes from a pump. I have kidney problems [indicates his lower back]. I urinate with pain [similar problems shall be met in other locations]. OK, water might be the origin of my illness, but we are tough people. Although the vets told us not to do it, here we eat the meat of animals dead out of sickness. We throw away the entrails and consume the meat, but not the soup. We even eat the meat of animals infected by rabies, after cutting their heads off. We never saw anybody die for that, but never do this with animals hit by anthrax (*chilmale*). When sick, we go to Gas/Gallas dispensary, at a distance of just two-hour walk."

At Goricha (October 11), Bokayo ('Rain') Rooba (F) aged 50: "The most prevalent human diseases are malaria, stomach-ache, chest problems and few cases of pneumonia. We refer to the Malabot dispensary. Health problems affecting my children? They have none".

At North Horr (October 12), Salesa ('Born when the village had been long in the same place') Guyo (M), aged 74: "I tell you: 60-70 years ago there were far less diseases than nowadays. Malaria was the top one, but only during rain time, and when precipitations were too strong. Being among men, I'd say something about sexually transmitted diseases. Beware: the disease transmission is only from women to men. If I get that sickness, I'm requested by the health workers to bring my partner to the health facility to be identified; therefore, I prefer not to go and stay without any treatment".

At Kanacho (October 15), Chuluke ('Shining eyes') Molu (F), aged 50: "Whenever we are sick, we go to North Horr Health Centre. But we go there only if we have money to pay for the medical service. If the disease is chronic, I have to ask for extended-family fundraising or take a refundable credit to facilitate the costs for medical interventions. The most common diseases are malaria, diarrhoea, headache and backache, in descending order".

At Dukana (October 16), an unnamed woman, while fetching water from Abdullahi Abdi well: "There is no use in teaching children to wash their hands: they have to drink water where human feet and animal paws mix".

At Eel Beso (October 22), Shuka ('Beloved') Abudho (F), aged 40: "I fear cancer, but at the moment the most prevalent disease is diarrhoea, because people use the dry rivers as latrines: the faeces are eventually washed by rain into the water. I disinfect water with chlorine tablets, but sometimes I have to drink it without treatment because

⁶⁸ Trostle J A and Sommerfeld J, "Medical Anthropology and Epidemiology", *Annual Review of Anthropology*, Vol. 25, 1996; p. 266.

there is currently no one in the dispensary to distribute the tablets. We only get them during the outreach programs undertaken by the North Horr Health Centre, once in a month”.

At Eel Beso (October 22), Isako Sori, OH project’s community health supervisor: “Here lives a lady named Buqata, a famous herbalist, renown all over Gabraland: people come here to be cured by her traditional knowledge of natural medicine. To access her healing, the procedure is to reach her house, accessible to everybody, no matter of age or gender; then you, as a sick person, first of all bring her incense (*lubadin*, a must) and then some presents like: tobacco, tealeaves, sugar”.

At Durte (October 23), Guyo (‘Sunset’) Mamo (M), age undetected: “When sick, we refer to North Horr or, better, to the outreach activities in our surrounding area”.

At Hori Guda (October 27), Soori (‘Light’, a colour of camels) Kushi (F), aged 27: “When somebody of my family gets sick, my husband decides what to do about it, according to the Gabra cultural customs. In case a mother is sick, women from other neighbouring families are going to take care of the children during her treatment. I delivered my first child at the hospital – advised by a nurse – but the second one at home. Diseases? We are all very well. Not many diseases around. Only malaria sometimes. Well, now I’m in a hurry because I have to go to town to buy cabbages and onions before they get finished”.

At Hori Guda (October 27), Daro Roba (F), aged 30: “Here we are not worried about any specific disease. You can see that all people and animals are well [she looks uneasy and displeased to talk about diseases]. Regarding decisions about family’s health, my husband takes in his hand all business about it. In all cases, if we have malaria, stomach ache, headache, backache, chest pain, things like that, we go to the North Horr Health Centre. But I repeat myself: I’m not aware of any human disease at the moment”.

At Durte (October 29), Kame (‘Thursday’) Bashuna (F), aged 30: “I have delivered at home, the traditional way, being assisted by a trained birth attendant. They are trained at the North Horr Health Centre about twice a year; they also accompany some women with delivery problems to the hospital: in that case, they might receive some incentive in order to build morale and co-participation. Water? Water cannot bring diseases: it is a good thing. Diarrhoea? Diarrhoea might be there, but we do not know its causes”. [Collective answer by the women who joined the discussion] “Yes, our children might sometimes get sick, something quite simple like a cough (*dofof*) or a running nose. When fever (*kando*) or cough are not strong, we use traditional medicines, like boiling-water fuming; inside the water we put leaves of a tree called *balsafi* [undetected], that we plant in front of our huts. We also use a seed called *fitto*, for running nose, headache and cold”.

At North Horr (October 30), Talaso (‘Tuesday’) Shamo (F), OH interpreter/assistant, aged 21: “I know three herbalist in town. One is in Dukana at the moment, for treating people: she was taken by motorbike to Dukana being called by some sick person. The second one is in Korka [a village some two-hour driving from North Horr]. The third herbalist, mother of Qaballé [our cook], is in town at the Hori Guda settlement, but she retired because of age; her daughter took her place in giving out traditional medicines. They are Watta.⁶⁹ I never made use of any herbalist’s drug, but once I put on a charm against the evil eye. It is a flexible plant that can be divided and tied around somebody’s left arm together with a small piece of woman’s black scarf; it contains substances like salt and special herbs for prevention from or cure of the evil eye. When I felt to be all right, I removed it”.

At Daga Boji (November 03), Jihike Jibba (‘Born with full moon’) Bulu (M), quite old: “After the fresh water is finished in the hand-dug wells, and I have to resort to the borehole water, I experience problems in urinating and I feel kidney pain, here. I checked: when I drink salty water I feel pain”.

At Eel Beso (November 04), Gumato (‘Friday’) Elema (F), aged 57: “You take malaria drinking dirty water. Mosquitoes live in the grass, not in the water, so malaria doesn’t come from mosquitos. Sometimes I get chlorine tablets to purify water for the family: we use them, if available, for all water, even the one from the well. We may stay without chlorine supply up to 3 weeks, but we get no diseases from non-purified water. Diarrhoea comes from food, not water”.

4.2.1.1 – REMARKS AND SUGGESTIONS

Strict privacy about personal health failures is a responsive asset in a difficult environment: it highlights the survival of the fittest, even if only as a social show. As noted before (Ch. 1), the pastoralists met during the mission were reluctant or vague about their health status and the most common diseases of their households. They tried to get rid of our indiscreet questions by a blunt “malaria and common cold” (by men)

⁶⁹ A group of former hunter-gatherers, now inserted inside the Gabra social system; their status is very low, and many are ashamed to confess their origin lest of being despised because poor (at the beginning, the equivalent of having no livestock); on the other hand, they are still considered, like the Ndorobo among the Samburu and the Okiek of Kerio Valley, the masters of local nature-spirits; many of them are smiths or herbalists.

and “diarrhoea and stomach/backache” (by women). Only older men – usually when alone – ‘confessed’ to be personally sick: all other information was generic and referring to a hypothetical ‘community of the sick’, living and suffering somewhere else.

It is therefore imperative to conduct an in-depth study on the local perception of diseases, and how it affects the field-observed poor health-seeking behaviours. Even local medicine and its remedies should be furtherly explored, in order to build a bridge, connecting disease with sickness and illness, i.e., hard medical science with the society and the individual in sufferance. In this process, a great care must be adopted in asking questions about people’s (and to a certain extent animals’) health. Following instructions by health institutions, even in epidemiologic crisis or disease outbreaks, only symptoms – and not diseases – must be reported, until proper investigations and results are provided by health institutions of County and GoK.

OH scientists inform us that 60.3% of ‘emerging infectious diseases’ (EID) result from zoonosis and have been increasing in recent years; on the other hand, the majority have their origin in wildlife (71.8%), not in livestock.⁷⁰ The deep relationships with their animals might explain why pastoralists in the PA have a very low understanding and knowledge of a zoonosis like brucellosis, present everywhere and very common in the PA (see 4.2.2). What we mean, is that pastoralists do live in a brucellosis-dense environment because of milk as their staple food; of course they know there is such a disease around, but they do not see how their animals might directly harm them. Additionally, having not acquired any sort of awareness on the causes or effects of certain human diseases, the locals still perceive that these could be associated to a curse from an elder or a malevolent witch. This perception contributes to poor health-seeking behaviour, especially among nomadic herders.

Following this knowledge gap, an awareness program about zoonosis should be considered a priority in the OH project’s development. As far as we could evaluate, correct information about two zoonosis, anthrax (chilmale, present in the PA since a long time) and Rift Valley fever (recent), arrived on target: see how.

Malaria (erroneously but firmly shared with the fellow-camel’s health) is a common issue in our interviews, but we have not gathered sound statistics about it. Even about this diffused pathology, the disease cycle is not understood, leading to poor prevention, like no clearing of pools around households and no protection from mosquitos. While recommending the provision of mosquito nets (especially targeting pregnant women and lactating mothers), we suggest an information/awareness campaign during clinics and outreach activities, keeping in mind that pastoralists are busy milking their animals just during the worst hours of anopheles activity (from sunset to 09 PM).

About a differential gender approach to health in the OH project, we suggest a focus on male accidents. Pregnancy is not a disease, but special medical and nutritional attention is paid to pregnant women throughout the world, in order to protect puerperae and infants from health hazards and risks.⁷¹ The situation in the PA asks for specific care, because women pastoralists and infants are physically (body structure), culturally (taboos and interdicts) and environmentally (hygienic conditions) exposed to higher and more specific hazards/risks – in delivery and during the first year afterwards – than other women.

Without entering the issue with the little field information we gathered⁷², here we suggest to pay attention to an analogous exposure of adult and young male pastoralists to hazards/risks during their movements-with-livestock in a dangerous environment. From conflict to extreme events (floods, bush-fires, droughts), from denied health-seeking behaviour to an array of accidents in the ‘natural environment’ (from thorn-caused infections to broken bones, from snake and insect bites to ulcers, to end up with strokes and, of course, evil spirits), injured Gabra pastoralists do not appear in any referral health facility (as far as statistics say: we had some information about accidents only at the Kalacha Hospital, in town), but their agency as healthy persons is hindered every day they spend ‘in the bush’. Being all these hazards and risks related to One Health because they involve the person, his animals and the environment, we suggest to open a dedicated sector to male accidents, to side-up the ongoing activities protecting pregnant women, puerperae and infants.

⁷⁰ Frank D, “One world, one health, one medicine”, *Canadian Veterinary Journal*, Vol. 49, November 2011; p. 1063.

⁷¹ In health jargon, according to the Canadian Centre for Occupational Health and Safety (CCOHS), a hazard is any source of potential damage, harm or adverse health effects; a risk is the combination of the probability of the occurrence of a harm and its severity.

⁷² See the report by Comberti G and Shamo T. (2019), *op. cit.*

Gabra men might not like that we fiddle with their demography and they could be disturbed because of their 'shame mind-set' (see Ch. 1). Even their mothers show nonchalance about accidents: in Durte (October 29) Aado Umuro, aged 30, with four children (her first born being 15, last born 2 year old), states she teaches her children to be "careful with fire, scorpions in firewood, motorbikes on the road, and not to go to the wells lest they might fall in them", but she refuses to further elaborate on this.

Anyway, it should be understood that accidents to men are affecting the whole community at large, just like the loss of a puerpera and/or her baby. A survey of accident clusters and an education campaign about the topic of accidents among the PA's adult male population, should be started as soon as possible.

4.2.2 – PUBLIC SERVICE AND PRIVATE PRACTICE: VOICES FROM HEALTH POSTS

As a countermelody to the above idealised and denying narrative of self-in-sickness among the pastoralists in the project area (see Ch. 1), hereafter we report the voices of the medical personnel we met and interviewed in all the health facilities inside the PA we managed to reach.

At Gas/Gallas dispensary (October 10), John Mwenda (M, not Gabra), who still defines himself 'Human Health Worker': "In this dispensary we mainly treat diarrhoea, respiratory tract diseases and skin infections. For some data, please refer to the target population for North Horr 2018 (see photo 8). During outreach activities, we make use of oral information only. In my opinion, the most important thing is to motivate the health volunteers in campaigning. When we campaign about hygiene, only oral explanations are given, without use of any other medium. The medicine supply is low and I haven't received any additional stock. It would be nice to count on a centralised supply systems for medicines".



Photo 4: Interviewing the nurse at Gas/Gallas dispensary (courtesy by Kurewa)

At Malabot dispensary (October 11), Kurfa ('Short'), possibly Gabra (F): "Here we have a nurse and a nutritionist, but they are away. I am not supposed to dispense medicines, but I do it out of necessity; I am also a midwife. Today I treated a common cold case (*dagfof*), a headache and tested the blood for malaria with an India-made rapid blood test [kept inside the heat of the dispensary in carton boxes]. I perform HIV tests too. Around the dispensary operate some 30 Community Health Volunteers [CHV] who deal with awareness and alert. At the moment the main problem with children is dysentery and urination with blood. In emergencies, I refer the sick to Kalacha".⁷³

At North Horr private pharmacy/clinic (October 15), the assistant pharmacist [a bit unsure of himself]: "I'm doing good business, with a two-week investment in drugs of about 150,000 Ksh [about 1500 €]; medicines can reach North Horr from Nairobi in just three days after my order. Besides selling drugs, we offer consultancy on male circumcision and minor surgery, or deal with other health problems".

At North Horr private test laboratory (October 15), the lab technician: "I previously worked for the Government and then opened this private practice, being quite successful after only six months. Today I already tested five people,

⁷³ In all dispensaries, the Education Expert of the OH project took notes and pictures about the informing/training materials; see Comberti G (2018), *op. cit.*

mainly women: on a 'good day' I may even test 30 patients. The most common disease detected is brucellosis (more than 30% of tests) which leads us to zoonosis: I participated in a GoK's research about them".

At Dukana Health Centre (October 16), Isac Bett (M), nurse from Nakuru County: "Here, the top health problems are: 1) it is difficult to get to outreach locations (we spend some 20 days per month on this activity); although we are having support by NGO's cars, still the places are far and no roads, sometimes; 2) poor health-seeking-behaviour; well, it's practically impossible that a pastoralist leave livestock without assistance; 3) strong cultural beliefs prevent access to health, like compulsory husbands' permission for women, ritual calendars, unfortunate days and so on; 4) talking about nutrition, I press the Gabra to have a variate diet: Dukana is on the road from Ethiopia and can get a variety of foodstuff, more than in North Horr, but people stick to their diet. This is mainly milk, which is nourishing, but not always available. They don't know how to prepare something easy like *uji*, while beans and maize-meal are too expensive. Children may be fed only with tea and milk (*chai*). And they have a taboo on fish, even if Lake Turkana is not far and they could get a supply of dry fish from Moite or Ileret. Notwithstanding their cultural constraints to modernity, the herders learnt to use the chlorine tablets that are provided for purifying water. Most patients are coming from Dukana town: I receive about 30 patients a day, mostly women and children. Many sick people fail to refer to health facilities because of distance and because they don't know enough about bio-medical treatment: so they get to the dispensary too late".

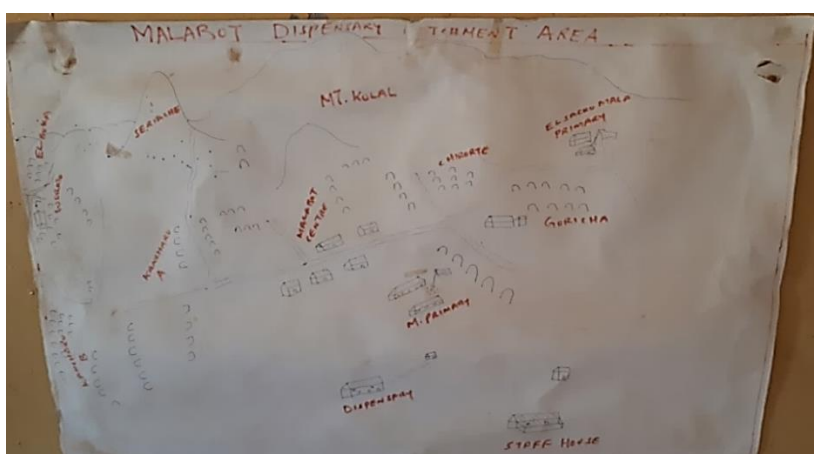
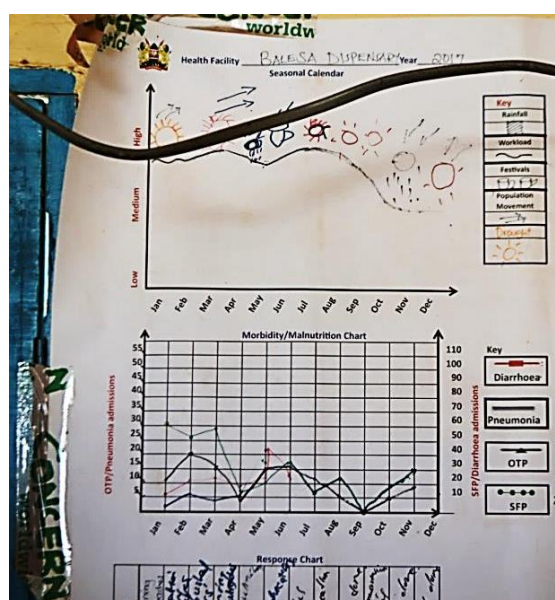


Photo 5: Catchment area sketch-map at Malabot dispensary (courtesy by Kurewa)

CITIZEN SERVICE DELIVERY CHARTER BALESA DISP			
SERVICES RENDERED	PATIENT/CLIENT REQUIREMENT	USER CHARGE	WAITING TIME
- Maternal health services: advice, delivery, abortion, emergency referral, postnatal services, family planning service	- Antenatal Care & cooperation from clients	free	up to 15 minutes
- Child health services: vaccination & vitamin A, health nutrition & counselling	- Visit health facility with mother child & booklet cooperation from client	free	up to 10 minutes
- Child health services: children below 5 years, health & children, above 5 years	- Facility registration card	free	up to 10 minutes
- Voluntary counselling & testing (VCT)	- Client request & cooperation	free	up to 30 minutes
- Community health services: household visit by community health workers	- Participation of community & cooperation with community health workers	free	up to 1 hour
SERVICES RENDERED	PATIENT/CLIENT REQUIREMENT	USER CHARGE	WAITING TIME
- Health promotion & information	- Public interest to information & access	free	up to 30 minutes
- Outreach service	- Visit villages, clients cooperation & participation	free	up to 30 minutes
MISSION: OFFER QUALITY HEALTH SERVICES TO ALL.			



Photos 6 and 7: Health Services (left) and Charts (right) at Balesa dispensary (courtesy by Kurewa)

- At Eel Hadi dispensary (October 18): no health personnel's interview because the dispensary is temporarily closed.
- At Balesa dispensary (October 18), Pauline (F), from the Meru area: "Here the fully employed staff is: one nurse, one community health assistant [*sic*: identify position] and a nutritionist. At the facility refer also 30 CHV, moving around the area to report symptoms and cases. in Balesa we have a challenge: poor health-seeking behaviour. The reason? Most people are far from the facility, so only the nearest people make use of our services (see Photo 6); anyway, the staff go 4 days per month to outreach activities among distant communities. Another problem is that women do not seek service for their delivering, but prefer the traditional birth assistants: I don't know why. You see the nutritional charts for babies (see photo 7), but my objective is more general: some women are starting to introduce new foodstuff like beans, watermelons, pumpkins and the like, grown by them as a starting activity. Soil in Balesa is good for agriculture" [the nurse shows her strong agro-cultural background].
- At Kalacha Referral Hospital (October 19), the administrator Mr. Rotich (M), not a Gabra: "We are facing some challenges: one is the mobility of the pastoralists, which creates problems in reaching them for immunization, a key issue in any outreach programme; some vaccines must be repeated after one month: where would the same nomads be by then? We are reported cases of insecurity in the area, but that is manageable. If compared with the mobility of nomads, the road network is quite poor, preventing people to reach the hospital and the health services to reach the people. As far as delivery services are concerned, the hospital and the TBA keep strict relationships, but there are also some cultural constraints: most doctors are male and that is preventing women to feel at ease during deliverance. Most pregnant women referring to the hospital result in being anaemic, aggravating their conditions in case of problems during delivery. This 'lack of blood' might come out of poor diets because early pregnancy, according to the Gabra, leads to the taboo avoidance of certain foods, even meat, with consequent problems of anaemia.⁷⁴ Illiteracy and language barriers aggravate the problems while dealing with patients. We have some Gabra staff, in case of language or cultural barriers. I'm quite confident that these problems may be easily solved with a proper interface/chain from the pharmacist up to the specialist. The staff at the hospital is of about 45 persons: 8 nurses; 2 clinical officers; 2 public health officers; 1 administrator; 1 CEO; 2 laboratory technicians; 2 medical doctors; 1 anaesthesia specialist; 1 dietician. A gynaecologist is available only at Marsabit Hospital. The drug supply is not well organized to receive the medicines on time, even if needed. The supply comes thrice a year, whatever our needs may be. Funds are not enough, obviously, and that is affecting also the provision of laboratory reagents and chemicals, impeding the full operational agency of the hospital. Top common important diseases reported at the hospital: 1) respiratory tract infections; 2) urinary tract infections; 3) pneumonia; 4) intestinal worms; 5) diarrhoea; 6) injuries (broken legs, etc.: most of them are traditionally repaired, with huge full-recovery problems); 7) ear infections/conditions; 8) brucellosis; 9) typhoid; 10) other respiratory system problems. Kalacha can count on 60 CHV, who only get lunch when engaged, no other incentive. Our selection criteria about them are mainly two: 1) willingness and 2) communication skills (local language, English, literacy, training etc.). The hospital was providing free services, but now the patients have to pay (for instance, fuel for the generator when using X-rays). After some understandable resistance and complains, the community is starting to accept the new system. Otherwise they resort to local herbalists".
- At Eel Gade dispensary (October 19), Safia Abduba (F), Gabra nurse in charge. "Only the persons near the health facility refer to it because of the distance. Many pastoralists keep using the traditional medicine; e.g., a woman died out of a scorpion sting because she did not come to the dispensary to cure it, and eventually she died. The dispensary may treat some 10 patients a day; the majority are children under 5 and women. Obviously, men are obliged to follow their animals. Common diseases are, in order: 1) respiratory tract infections and 2) diarrhoea. The facility counts on 23 CHV and manages to keep two outreach activities going on every month. We target surrounding places like: Daaqane, Eel Gurracha, Eel Boji, Yaa Mangudho [*mangudho* means 'old']. We make outreaches at Eel Buda and Balal [the main river of the region]. During outreach we mainly make immunization and supply food to the undernourished. We monitor babies' growth using scales and the MUAC tape".
- At Eel Beso dispensary (October 22): the dispensary, built in 2017 by the County Government, is apparently not in use, even if people report that drugs are inside, but no health personnel to distribute them. At the moment of our survey there is no connecting pipe to water tanks and not even a proper entrance for cars.
- At North Horr (November 4): Christine Aado ('Sunday') Shande (F), health volunteer: "In North Horr town there are 16 operative CHV, 8 males and 8 females, who participate in the 6 day-per-month outreach activities. Our latest outreach was from 16 to 22 of October, this year".

⁷⁴ In the Somali Region of Ethiopia, the editor was informed by doctors that tea consumption can lower the iron content in the blood of pregnant women.

At North Horr Health Centre (November 06), Ibrae ('Sunday' for males) Wato, community health volunteer: "We cover the settlements of Eel Isako Malla, Goricha, Boji, Eel Beso (2 locations), Kanangos, Durte, Qorqa (2 locations), Burra, Qabdo. Our outreach team is made out of three volunteers, plus a nurse and a nutritionist: we always move as a group. We vaccinate, check weight and MUAC⁷⁵ in children, distribute Plumpy'nut to underweight children and some porridge to all pregnant or milking (0-6 months) women, plus TB sick persons, as far as we have available supplies; in case of lack, we use selective criteria, privileging weak subjects like widows or underweight women. We also provide the community with chlorine tablets. Plumpy'nut and porridge are supplied by NGOs, but many times their quantity is insufficient. While on outreach, CHV provide information about hygiene, disease prevention and such. We teach to thoroughly wash hands and children: there was a free distribution of washing soap for six months, but women often used this soap to wash clothes. Only in some areas, e.g. Qorqa, women appear to follow the correct practice.

As volunteers we meet problems during outreach activities: some *olla* are not easy to access because they are far away from the main roads and *lagga*⁷⁶ are sandy or muddy according to the season, especially around the Qorqa area. Mosquito nets? The County Government provided nets during the outbreak of malaria of September 2017. We volunteers received some training about health from GIZ.⁷⁷ We utilise their flip-charts, but their content is only about conception, pregnant women's nutrition, and child development after weaning. Let me write something in your notebook: 'I kindly request a training for CHV also about animal health, because the communities get income from their livestock. I also need training on deliverance practices, because in faraway localities a CHV is very useful in assisting women. Furthermore, I would like to have some training about food conservation, like drying of meat, a practice already in use among pastoralists, but that needs better hygiene to be healthy'. Thanks".

Organization unit	Total Population	Population 15-24 years	Population 25-59 years	Estimated Number of Pregnant Women	Estimated Deliveries	Estimated live births	Households	Population female	Population male	Population over 60 years	Population under 1 year	Population under 15 years	Population under 5 years	Women of childbearing age (15-49yrs)
Balesa Dispensary	5280	1109	1394	148	148	148	1056	2740	2540	312	143	2466	829	1267
Bubisa Dispensary	5901	1239	1558	165	165	165	1180	3063	2838	348	159	2756	926	1416
Burgabo Dispensary	2655	558	701	74	74	74	531	1378	1277	157	72	1240	417	637
Dukana H/C	12423	2609	3280	348	348	348	2485	6448	5975	733	335	5802	1950	2982
El Hadi Dispensary	2316	486	611	65	65	65	463	1202	1114	137	63	1082	364	556
Elgade Dispensary	3044	639	804	122	122	122	609	1580	1464	180	116	1422	478	731
Forolle Dispensary	2486	522	656	70	70	70	497	1290	1196	147	67	1161	390	597
Gus Dispensary	5311	1115	1402	149	149	149	1062	2756	2555	313	143	2480	834	1275
Hurri-Hills Dispensary	2796	587	738	78	78	78	559	1451	1345	165	75	1306	439	671
Illeret H/C	10766	2261	2842	301	301	301	2153	5588	5178	635	291	5028	1690	2584
Kalacha Hospital	6599	1386	1742	185	185	185	1320	3425	3174	389	178	3082	1036	1584
Maikona H/C	4536	953	1198	127	127	127	907	2354	2182	268	122	2118	712	1089
Malabot Dispensary	1637	344	432	65	65	65	327	787	850	97	62	764	257	393
North Horr H/C	10846	2278	2863	304	304	304	2169	5629	5217	640	293	5065	1703	2603
Shura Dispensary	1122	236	296	31	31	31	224	582	540	66	30	524	176	269
Turbi Dispensary	5590	1174	1476	157	157	157	1118	2901	2689	330	151	2611	878	1342
North Horr Sub County	83306	17494	21993	2333	2333	2333	16661	43236	40070	4915	2249	38904	13079	19993

Photo 8: Target Population for North Horr sub-County Health Facilities, 2018, as posted in Kalacha Hospital (source: Marsabit County Ministry of Health; courtesy by Kurewa)

⁷⁵ Mid-Upper Arm Circumference, the circumference of the left upper arm, measured between tip of shoulder and tip of elbow. MUAC is used for the assessment of nutritional status. It may predict death in under-nourished children better than any other anthropometric indicator.

⁷⁶ Dry river beds, where wells are dug.

⁷⁷ The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH or (GIZ) is a German development agency headquartered in Bonn and Eschborn that provides services in the field of international development cooperation.

4.2.2.1 – REMARKS AND SUGGESTIONS

Moving in the PA asking questions about human health was a delicate matter, above all inside health facilities. The fact that our random-based methodology did not take ‘appointments’, permitted us to come up with ‘fresh’ information, and the health personnel were all very cooperative and open. Although we never interviewed a sick person inside or nearby the health facilities, the editor and field mission personnel were (duly, but late) instructed on October 29 to be careful about health data at all levels.⁷⁸ Thereafter, not to deal with sensitive personal data and interfere with the privacy of sick persons, we stopped asking questions about human health. Even before this, no picture of patients or sick people was ever taken. As already stated, the derivative suggestion to OH personnel is to consider and refer only symptoms and not specific diseases.

To improve the public health facilities, some steps are to be operationalised, from the establishment of laboratory services – to facilitate accurate diagnosis of diseases, subtracting it from deregulated private practice – to public outreach programs and awareness about Water and Sanitation Health (WASH, see also 4.4.5). For instance, the team observed that almost all visited health centres were equipped with malaria self-testing equipment, making it easy to diagnose the disease; but prior to this, it was diagnosed on certain symptoms, such as fever, headache and loss of appetite, which in most cases lead to misdiagnosis: therefore, people started to trust private laboratories more than the public-health ones.

*The editor is well aware that the OH project does not deal with ‘tablet provision’. Because of that, the project personnel should explain in depth to health facility operators what is the OH’s goal, and how we can assist them in the supply and distribution of drugs (better, faster, cheaper in availability and distribution) by a centralised distribution from Marsabit County Health Ministry, to be designed and implemented. For instance, per OH approach we might check the reaction of drugs, tests and instruments to high room temperatures; see also the appropriate conditions for transport, storage and packaging. The diffusion of private pharmacies – just where all these requisites do not appear satisfied – can lead to negative health practices (think about the epidemiology of antimicrobial resistance).⁷⁹ The OH project should support by any means the regulation of counterfeit or low-quality drugs (both for humans and animals). These medicines are cheap and may facilitate the approach by pastoralists to a fake bridge between traditional and bio-medicine. For instance, in malaria treatment the informants confirmed that they still make use of local herbal remedies such as Aloe vera and the neem tree (*Azadirachta indica*, whose leaves are boiled, and the solution ingested by mouth). However, beside using the locally available drug to treat malaria, the locals reported that they are increasingly using bio-medicines: that it is why the project should keep watch on drug quality and distribution.*

The health facilities are particularly weak about ‘new’ diseases like cancer. Cancer, not only causes high mortality, but also socio-economic impacts to the families of those affected. The patients are usually referred to hospitals with cancer treating facilities, such as Meru Hospital, wherefrom most cases are referred to other hospitals in Nairobi. All this sums up to extra costs that can hardly be met by the affected persons and their families. In the PA, currently, only the hospital in Kalacha has cancer diagnostic and treatment facilities; however, locally there are not enough drugs and medical personnel with sufficient knowledge of the disease.⁸⁰

A notation: during the mission, we could see how women tend to refer to health facilities more frequently than men, notwithstanding the fact that their husbands and male elders decide about health strategies and expenses. This is probably due to the specific attention paid by health authorities to programs of assistance to mother/infant health and nutrition. At the moment of the mission, aspects dealing with malnutrition

⁷⁸ It happened during the TriM exercise and information exchange with VSF-G scientific advisor Isac Lubutsi (later removed) and the OH Project Coordinator Odhiambo: they delineated the health and veterinary organisation at County level, clearing the limits in which all OH project activities must be kept, above all when interrogating health personnel or defining diseases with the pastoralists, that must be assessed by Central Government.

⁷⁹ See Zinsstag J *et al.*, “From ‘one medicine’ to ‘one health’ and systemic approaches to health and well-being”, *Preventive Veterinary Medicine*, Vol. 101, 2011, p. 153.

⁸⁰ From Kurewa AG (2018), *op. cit.*, Ch. “Pathways to health”.

were not evident in the OH project: they should be enhanced, also because, in a pastoral context, nutrition is connected to all three domains of One Health.

We strongly recommend to obtain a human health data-base from all concerned County institutions, in order to give the project management directions to design a specific decision support system (DSS) with the help of TriM for data collection and mapping.

In the field we have seen that zoonosis are not properly recognised by pastoralists, with the exception of anthrax and Rift valley fever (see also 4.3.2). It is imperative, for instance, to build awareness on causal factors in the transmission of brucellosis, its prevention, effects, as well as making its treatment locally available. On the other hand, a mono-focussed initiative on zoonotic diseases might induce the usual mistake in operationalising the North Horr OH project: are we sure of being well aware of the environmental component of the chosen zoonosis? Is there one?

4.3 – ANIMAL HEALTH

When speaking to local herders, the mission team managed to get information about the biuniqueness of the human-animal health dipole. Beware: the pastoral truism “If livestock are well, people are well; and if people are well, livestock are well” is asymmetrical in the pastoralists’ perception and actions. The herder, even if ill, cannot leave his animals alone; therefore he would consider his personal health at a different trophic level from the one of his livestock. At the same time, livestock diseases might affect the whole community at great speed; therefore, animal health is preponderant in the scale of pastoralists’ decision-making, being it economic or social. For instance, the mistreatment of camels in terms of inadequate care will translate to misfortunes not only to the herder, but also to all Gabra. This collective sense of responsibility towards caring for the camel enhances the solidarity and social cohesion among the herders, and therefore improves their health and social well-being.⁸¹

4.3.1 – OMO POWDER, COOKING FAT AND OTHER VETERINARY MEDICINES

At Eel Isaako Malla (October 10), Guyo (‘Sunset’) Yattani (M), aged 61: “My animals may have lung fever, running nose. During the last season, a lot of these diseases, plus abortion (especially for camels) was also reported [possibly due to *Brucellosis*, a well-known zoonosis, but not recognized as such by Guyo]. Camels get *malla* which is caused by tsetse flies. Ah, ticks are everywhere. The drugs from the Government and local pharmacies are not as good as before. If you wash animals, ticks return. By the way, we prefer to have better medicine provisions for animals than for humans. Our camels are washed [dipped for ticks] every two weeks before rains. Remember: before vaccines for people, bring the ones for animals”.

At Eel Boru Magado (October 10), Barile (‘Dawn’) Guyo (M), aged 70: “My brother informs me that in our Yaa⁸², animals have fever, after that diarrhoea, and they subsequently die”.

At Barambate (October 10), Wario (‘Early night’) Abutho (M), aged 67: “Sometimes camels have swollen lymph-nodes and their urination is restricted for a long time. They also do not eat well. When these symptoms appear, we check the animal, looking for some sickness. Young shoats can get sick by eating acacia pods. The prevalent diseases among our livestock are brought by ticks and some worms that cause problems in lungs and strange mental behaviour. The first thing to do is to check how animals eat. You want to know how a healthy animal looks like? Well, you check the eyes, whether they are open and clear. A healthy animal looks healthy, throughout. The *itha* shrub (photo 9) gives problems to shoats because its thorns prick their lips and the sap causes ulcers: they end up being unable to drink milk or eat grass or leaves. We cure this by applying cooking fat⁸³ on the animal lips. After rains we have a lot of bloating of the livestock belly (*furfur*) because of eating fresh grass, that is wet. We use Omo washing powder to induce burping. The grazing land at Hurri [‘Misty’] Hills is particularly bad for this problem”.

⁸¹ Kurewa AG (2018), *op. cit.*, Ch. “Animal health”.

⁸² The capital settlement where the elders of a Gabra power group (phratry’s *gofa* leaders) live, as custodians of their sacred paraphernalia.

⁸³ In most pastoral cultures of the area, animal fat is a healing remedy, a panacea used even for hepatitis in humans, as witnessed by the editor among the Samburu.



Photo 9: Itha shrub, *Commiphora* sp., at Barambate (courtesy by Kurewa)

- At Goricha (October 10), Bokayo ('Rain') Rooba (F) aged 50: "The animal diseases around here are lung and liver problems. We have ticks around, but they only affect camels, not people".
- At Gas/Gallas (October 10), John Mwenda (M), nurse: "As far as I know, for animal health pastoralists count on animal disease reporters (ADR), because the veterinary health system has no permanent base. Animal health dispensaries or posts are non-existent in North Horr sub-County".
- At North Horr (October 12), Salesa ('Born when the village had been long in the same place') Guyo (M), aged 74: "I possessed many heads of cattle, but now only 4, because the others died out of droughts. I keep them in Bura. I tell you the top diseases for camels of nowadays: lung troubles (*sombes*); *but* [unidentified], which is giving strong contractions to the whole body, like shivering, occurring during rain seasons; *kando*, the 'malaria of camels'; cough (*qufa*); *daadi*, the diarrhoea of cattle; *tumna* [unidentified] which affects the mouth and we cure by a potion from a tree found in Huri Hills, called *burs*⁸⁴, whose leaves are smashed and put in water; the medicine is then introduced into the organism through the nostrils. *Oyale* [unidentified] is a disease of shoats affecting hooves: if they cannot walk, they are not able to eat; *mira* [unidentified] affects shoats by turning their meat to blue. Zoonosis? The only one I know is anthrax (*chilmale*), that is contained by fire inside the pens (*mona*). We buy drugs at the North Horr vet pharmacy, but also from the livestock buyers. The few veterinaries on the ground are giving good service. Just in case, in Balesa there are still some traditional healers (*chirres*) that cure camels".
- At North Horr (October 13), Ibrae ('Sunday') Jillo (M), adult literacy teacher, aged 58: "Zoonosis? Gabra pastoralists were aware, and still are, of anthrax as the most dangerous disease being transmitted from animals to people and *vice versa*. In the old days, anthrax was prevalent if compared to nowadays. Today, anthrax is almost disappearing. I have to say that there are no zoonosis around, if you see things in pastoralists' perception. Only quite recently they have learned about the Rift Valley fever as being a zoonosis. I consider camel milk it quite safe as compared to shoats' and cattle's. On the other hand, if a camel gets very sick, we restrain from drinking its milk. After anthrax, the most feared disease is *kando*, compared to malaria in humans. Before bio-medicine, we used local treatments for any livestock disease, like putting tobacco (*tambo gese*, in leaves) in large quantities of water and feed the liquid to the animals. *Aloe vera* is boiled to a thick paste, and its crystals are dissolved in water and used as medicine even for humans (terribly bitter!). For malaria, people might be given this treatment because herders believe that bitterness kills the disease. We have also *malla*, a camel disease that makes the animal very weak, gradually having teary eyes, dropping ears, joints making noise [dehydration or trypanosomiasis?]. I think it has a genetic origin, since it is not transmitted from one animal to the other".
- At North Horr private veterinary pharmacy (October 15), an aged elder acting as a pharmacist: "The drug seller is not around. I don't know how his commerce is going on. But I was a pastoralist myself: I understand all symptoms after so many years of experience with livestock. I help the vet-pharmacy clients: I sell all available veterinary drugs".
- At Kanacho (October 15), Chuluke ('Shining eyes') Molu (F), aged 50: "We are not scared about diseases, in particular the ones of livestock; anyway, we don't like to see any of our animals sick, because we depend on them, and sell them to get some income. Animals are like farms for us. Whenever the animals get sick, we go to North Horr town to seek for medicines. However, if we manage to diagnose the disease, for example *malla*, we use traditional

⁸⁴ in Borana language, *baresa* is *Terminalia brownii*, for veterinary use; for botanical reference see Maundu P and Tengnäs B, *Useful Trees and Shrubs of Kenya*, World Agroforestry Centre, Nairobi 2005; p. 15.

medicine like tobacco which is dissolved in water and fed to the camels. If we don't know the kind of disease, we go to the pharmacy, explain the symptoms and get prescriptions and drugs from the vet shop.

At Eel Hadi (October 18), chief Salesa Adano (M): "Our camels and cattle are somewhat in acceptable conditions. Diarrhoea in shoats is still going on, but its causes are unknown. Even without this disease, animals are very weak and sometimes they die. Something is wrong in the nutritional value of grasses, that used to be abundant towards north, near Ethiopia".

At Eel Beso (October 22), Abudo ('Saturday') Ibrae (M), nickname 'Badaqe' (meaning unknown), responsible of 408 households: "There was an outbreak of a recent disease inside our goats, with bloody diarrhoea. It may have arrived here by contamination with the livestock in Dukana, where we have our *fora* camps. At the moment, the nearest good pasture is at 5-hour walking distance. Please, visit the sick goat inside that covered pen. You see? It's thin like stones; look at its yellowish eyes; it refuses to eat the grass I give it. Explore mouth and anus of the poor animal".⁸⁵

At Durte, (October 23) Guyo ('Sunset') Mamo (M), head of 127 households: "At the moment, our livestock are towards the north. Many goats got diarrhoea, and we have already reported its outbreak to the local authorities. Only few small goats managed to get vaccinated because of the distance of animals: they have to stay at the grazing areas".

At Hori Guda (October 27), Daro Roba (F), aged 30: "Our livestock are very far, in Derate, towards Ileret. So I'm keeping only 8 goats, for my household's needs. And they are all well".

At Hori Guda (October 27), unnamed (F): "There is that foreign plant [she points to an *algarroba* shrub⁸⁶] that affects the health of livestock. But only goats and sheep: it causes diarrhoea. If the case, we treat shoats with salt and water".⁸⁷

At Hori Guda (October 27), Wario Qeqo (M): "A major problem is that since 5 months ago up to now, dromedaries die all of a sudden, without specific symptoms [brucellosis?]. Even goats are sick at the moment, with diarrhoea".⁸⁸

At Eel Beso (November 04), Shamo Adano (M), who worked for FarmAfrica: "We had shoats with diarrhoea all the year round, but there is no relationship with what they eat around here. There must be some contagion with the livestock in Dukana".

At Eel Beso (November 04), Gumato ('Friday') Elema (F), aged 57: "I don't know the reason why animals get sick, maybe because animals do not know what they eat; they eat anything, and after some days they get the disease. When animals are sick, I use traditional remedies, but in case of prolonged sickness my husband calls North Horr by mobile phone for assistance. Some vet is going to come. For bloating in shoats we use Omo powder to induce burping and gas exit: it works. If we don't have any Omo, we may use the milk from the sick animal instead".

At Eel Beso (November 04), Baraqa ('Before dawn') Kae (M), elder: "Fever (*kando*) comes after rains and before dry spells. For dromedaries, the agents are *kitan shilmi*, camel-flies. Also ticks bring diseases to livestock: everywhere blood is sucked, there is danger for health of people and animals. Many camels died at the beginning of the year, we don't know if for brucellosis or Rift Valley fever outbreaks, or poisoning of some sort. A person I know lost more than 20. I myself 5, and not because of drought (*durat*)".

4.3.1.1 – REMARKS AND SUGGESTIONS

Due to the biunique-but-asymmetrical health relationship with livestock, pastoralists in the PA talked more freely (up to a certain extent and only after trust-building by the team) about the diseases of their animals than their own's. On the other hand, the fact that they consider camels like persons did not help our investigation about zoonosis; somehow this kind of diseases are obvious: people and animals get sick in the same way, from the same causes, most of the time unrecognised and unknown.

Zoonotic infectious diseases have been an important concern to humankind for more than 10,000 years. Zoonosis result from various anthropogenic, genetic, ecologic, socioeconomic, and climatic factors. These

⁸⁵ Pastoralists might not know bacteria and microbes, but are well aware of the 'inner environment', whose only access is through body openings: in pastoralists' view, every hole is somewhat dangerous, as previously confirmed to the editor by Turkana herders near the lake.

⁸⁶ This encroaching plant, acacia-like, is *Prosopis juliflora*; for effects on the local environment, see 4.4.4.

⁸⁷ Apparently, this is a traditional cure, but it may derive from the diffused use of oral rehydration solutions (ORS) for children in health facilities (the informant is a woman), reinforcing the inseparability of human/animal health among the Gabra.

⁸⁸ We ask the participants of this FGD if they noticed any new grass or plant, sprung by rains, that may be poisonous, because we heard many complaints about "new vegetation"; in case, they are advised to bring the grass or plant to the OH project experts, although no botanist is available at the moment.

interrelated driving forces make it difficult to predict and to prevent zoonotic emergent infectious diseases (EID).⁸⁹ Although significant improvements in environmental and medical surveillance, clinical diagnostic methods, and medical practices have been achieved in the recent years, zoonotic EID remain a major global concern, and such threats are expanding, especially in less developed regions. The current Ebola epidemic in Congo is an extreme reminder of the role animal reservoirs play in public health and reinforces the urgent need for globally operationalizing a One Health approach. Therefore a quick action towards filling the knowledge-gap about zoonosis in the PA is strongly recommended. On the other hand, just like for the case of human health, a mono-focussed initiative on zoonotic diseases – not fully recognised by pastoralists in the outer stations of the PA – might induce the usual mistake in operationalising the North Horr OH project: are we sure of being well aware of the environmental component of the chosen zoonosis? Is there one? Can we redress it?

During the mission, we observed that, as far as the editor knows, the North Horr sub-County does not have permanent animal health facilities, but only mobile interventions on demand, or during outbreaks, in addition to vaccination campaigns. Therefore, people mainly rely on traditional knowledge and experiences to both diagnose and treat sick animals. A further investigation about pastoralists' understanding (in any ways) of the transmission of disease and its agents, like bacteria, parasites and so forth, is recommended. Besides the newly trained personnel of the OH project, such an understanding must be shared with the Animal Disease Reporters (ADR); this notwithstanding the fact that they are recruited in each location mainly to provide information to the animal-health authorities about the outbreak or prevalence of animal diseases, after which the situation is going to be tackled and possibly redressed.⁹⁰

We understood that, with the availability of modern livestock drugs and veterinary services, the pastoralists in the PA have learnt a great deal on the importance of bio-medicine, and they are capitalising on using this to treat their animals. For instance, the informants reported that they use modern medicine to contain ticks or cure worms, but they also observed that present drugs have proved to be ineffective as compared to the ones they had been using in the past. This might point out to the infiltration of counterfeit or expired drugs in the local market.

While the animal health experts have been organising public outreach programs to vaccinate animals, they need to consider that since the Gabra are primarily relying on few selected milch animals for purposes of providing milk to the household (often the only available food), it will be prudent to conduct the vaccination programs during the rainy season, when milk is in plenty, so as not to affect their abilities to feed, especially their young ones (human and animal). We have been told by pastoralists, in many occasions (e.g., at Eel Beso, November 04, with specific questions to confirm previous information), that veterinaries in the field recommend not to drink livestock milk for ten days after vaccination. This has no scientific validity according to Antonia Braus, veterinarian and desk officer from Berlin-based VSF-G, but our field data report the perception of the herders (a mission goal in itself), who are, at the moment of the mission, at the end of the dry period: animals are few and have very little milk; therefore the veto by the veterinaries (so we were told) cannot be obeyed, and the milk is drunk after a couple of days. A suggestion: conduct vaccination campaigns only during wet seasons, when milk is in plenty; this will make it possible for the herders to plan the best schedule time for the vaccination of a section of their animals, while utilizing the rest for milking purposes. We are very happy to know that the health of pastoralists is not endangered by livestock vaccinations, but all veterinaries and OH project personnel should be more careful about their disseminated information. About this issue, a definitive document and oral narrative should be prepared by the OH physiologists and veterinaries, to be used during all activities in the field.

All in all, the most apparent fault in the animal health system is the lack of dedicated facilities to diagnose animal diseases and cure livestock: the project should design such a structure, physical and technical. We recommend, as an intermediate step, to integrate the traditional knowledge in diagnosis and treatment of animals with the scientific veterinary knowledge. This would help the herder to keep trust in his agency, but with a fixed place for quick referral in case of need. An added asset is going to be the public health control of smuggled and counterfeited medicaments.

⁸⁹ Jones KE et al., "Global trends in emerging infectious diseases", *Nature*, 451, March 2008; pp. 990-994.

⁹⁰ Some of the information in previous and following paragraphs come from the report by Kurewa AG (2018), *op. cit.*

4.4 – ENVIRONMENTAL HEALTH

All agencies involved in the One Health approach – from veterinaries to medical doctors, from local authorities to health policy makers – seem to be biased by a sort of ‘anthropic principle’: a healthy person, like a healthy animal, is somehow scientifically defined by biomedicine (same physiology, up to a certain extent); but what about a ‘healthy’ environment?

From a previous editor’s report about OH among the camel pastoralists of the Somali Region of Ethiopia – not so far from North Horr – we understand that in the OH approach we have to talk about plural environments at variable scale, from macro-regions to micro-biota:

The concept of healthy environment is not scientifically sound. A healthy jungle or a healthy arctic tundra can be very harmful to humans with their domesticated animals. We must then consider three OH ecosystem components, differentially perceived and lived by pastoralists:

1. ‘Natural’ environment (undisturbed by human activities: ‘healthy’ according to bio-evolutionary principles)
2. Artificial environment (modified by human activities: ‘healthy’ according to socio-political parameters)
3. Inner environment (microbiota, xenobiotic and symbiotic in people’ and animals’ physiology: ‘healthy’ according to biomedicine)⁹¹

Health is a matter of scale: a single ecosystem – like that of the PA – contains all three environments, at a decreasing scale (macro to medium to micro). Even if interventions – preventive or curative as they may be – might control disease vs. health in the artificial and inner domain, the natural environment is up to a certain extent unmanageable. Climate change and global warming, for example – even if talked about in our interviews – are far beyond any control by pastoralists, and not only. Therefore, in the OH debate the word ‘healthy’ should be substituted by a more correct and viable adjective: ‘healthful’ (*i.e.*, essentially, salubrious for humans, an adjective like ‘helpful’ and ‘harmful’), to be used about a natural environment where humans and domesticated animals (with alien microbiota) move in. The consequences of this ‘invasion’ are leading to an artificial (anthropic) environment, as the only desirable end-state, a finalisation that might not always be correct.

During our mission, we tried to reach a shared comprehension of a healthful environment, apt to take decisions about it. We considered the following aspects, among many others, that should serve as guidelines to next environmental missions:

- Level of control on the 3 above mentioned environments, that is, 1 (natural): avoidance/transformation of wilderness; 2 (anthropic): management of pasture and/or agro-pastoralism; 3 (inner): water, food and hygiene procurement and management.
- Water cycle (evapotranspiration; clouds; winds; rains; water storage, natural or artificial), on top of a water-point map-layer.
- Zoonosis (relationships livestock/environment; pastoralist/livestock; environment/pastoralist), with identification cards (to be designed by herders, veterinaries and medics); hotspot charts are to be produced in the future by feedback.
- Ceremonial calendar (in opposition/accordance to seasonal calendar; compulsory movements in unproductive/dangerous environments; involvement in traditional medicine).

In order to favour awareness and dissemination of the above mentioned environment-related issues and events, teachers and pupils in all schools inside the PA should be incited to constitute ecology-clubs, where environmental information is given, shared and transformed to be better and easier brought to the

⁹¹ Salza A, *Cloudless Skies and Whistling Thorns: Global Threats to Pastoralists and Livestock: Environment in One Health Perspective*, report on the research in the project “Emergency intervention to support drought-affected populations of Filtu and Dekasuftu, Liben Zone, Somali Regional State of Ethiopia”, CCM, Turin 2018; p. 3. The first to explore microbiota in an environmental context, was Evgeny Pavlovsky’s (1884–1965). He considered pathogens from an ecological perspective having their own niche; this can be in a specific space of an ecosystem, but also in an animal or organ to which they are most adapted.

household scale, building a continuous and retroactive upgrading of knowledge at all levels. Youth are the best initiators and facilitators: let us utilise their abilities.

The time-span of the mission was too short, conducted in a single season (end of dry period), and spread over a vast area, to provide significant quantitative data, but the qualitative narratives by pastoralists of their relationships with the multi-scale environment they exploit is worth listening.

4.4.1 – THE MEMORY OF TREES

At Barambate (October 10), Wario ('Early night') Abutho (M), aged 67: "The climatic conditions? Everything is calm and going well. I am more worried about diseases, not climate change, but something strange is going on: the *baddan* trees⁹² lost nutritional power in the last years".

At Goricha (October 11) an unidentified herder (M) fording a dry *lagga*: "You see, there is a lot of *algarroba* bush⁹³ (*Prosopis* sp.) all around; its thorns are sort of poisonous, and leaves are very unpalatable for all livestock, if not during extreme drought conditions".

At Goricha (October 11), Bokayo ('Rain') Roba (F), aged 50: "Currently there are less trees and pastures especially for the camels. As a result, the camels feed on *algarroba* which doesn't satisfy them enough. Even if it rains, the soil does not yield enough pasture for the animals as it used to do before".

At Baasgubatu (October 11), team note: this wide *lagga* has a name meaning 'Burnt by a great fire long time ago'; no information was retrieved about bush-fires as controlling agents of the health and productivity of the environment.

At North Horr (October 13), Ibrae ('Sunday') Jillo, aged 58: "I once slaughtered a sick goat – you already know we are used to consume sick animals not to lose their meat. In its entrails, respiratory tract and intestine I found a bulk of plastic bags weighing about 10 kg. I kept it hanging in my shop to demonstrate to every customer the risks of plastic. Abandoned plastic reaches the trees, therefore their leaves cannot breathe properly and sicken and die. Livestock chew it. Nothing like that with the traditional wood or fibre containers, that animals wouldn't eat anyway".

At Hori Guda (October 15), an unidentified man, collecting branches and leaves from a *mwarabaini*⁹⁴: "Even if this leaves are bitter, my shoats have to get used to this fodder, because there is no other green in town. All is overgrazed".

At Dukana (October 16), paramount chief Tuye (M): "Well, let me understand how the project will work towards controlling the environment [a bit mocking]. I am well aware of the difficulties of achieving this as compared to controlling animal and human health. You confirm me that the environment cannot be controlled, but there are a few ways to enhance the coping strategies about climate and related grass output. Fine: we'll help you in technological early warning and rain forecasting".

At Eel Hadi (October 18), John Iya Ibrae (M), catechist, aged 60: "The environment around here is good enough to sustain all kinds of livestock, cattle included. This was a very good place for livestock, but the number of cattle is progressively decreasing. To sustain a family, a minimum of 150 shoats is necessary".

At Kallacha (October 19), team's note: "The town, among some lava outcrops and hills, is very dirty with plastic waste hanging from every fence and hut; it looks like small walls at the base of any standing structure. Even the hospital is surrounded by waste products".

At Eel Beso (October 22): Abudo ('Saturday') Ibrae (M), age undetected: "Quite recently, in our area we have a problem with *kobbo* [*Calotropis procera*]; this plant grows on dried mud and is rapidly invasive: it was practically absent before the floods of last year. It ends up preventing good grass to grow. We have a similar problem with *algarroba*, although at the moment it is not such a nuisance. It rained the day before yesterday: we'll see if these plants shall take over the next year".

⁹² In the area, we identified *baddan* as *Balanites aegyptiaca* and *B. orbicularis*; these bushy, spiny evergreen trees are very important as fodder, especially for camels; their boiled olives are eaten by people; see Tablino P, *op. cit.*; p.340.

⁹³ Known as *algarroba*, *Prosopis juliflora* is an infesting bush imported from Brazil for forestation purposes; palatability of plants is underestimated in the relevant literature, while it is in all cases guiding livestock towards their favourite pasture, determining therefore the behaviour of pastoralists (grazing routes), in a two-way form of cooperation.

⁹⁴ The not-indigenous *neem* tree (*Azadirachta indica*), supposed to have 40 (*arabaini*) useful properties, from medicine to cosmetics and construction.

4.4.1.1 – REMARKS AND SUGGESTIONS

Although some of the following vegetation zones are outside the PA, it is important to consider and include them in the OH project as part of the health domain (as far as food and risks are concerned). The Gabra pastoralists depend on four main grazing areas which they exploit during the different seasons:

- a) Didgalgalu-Huri hills: a vast grassland on lava plains, used as habitual grazing ground, but lacking water; seasonal water points are at Warbusa and Bubisa lagga; Forole and Turbi have little water, but when it rains at Huri Hills in December, pastoralists start moving their livestock there until January/February (fission). They move south after the April rains.*
- b) Chalbi and the zone to the north east: it has water all down the east side, with wells at Maikona, Gamura, Kalacha, Malabot, Oroma, North Horr, Eel Beso, Nyaber, Huran Hura, Madolo and Sengute; the area is well watered, but it has insufficient grass to support long periods of grazing, being therefore used during from February to April, while preparing to go to Huri Hills in May and June; by June and July, herders concentrate in North Horr, Kalacha and Maikona areas.*
- c) Kanangos, Dukana and El-Yibo: lava scrub interspersed with sandy scrub country, similar to Dida Galagalo, which has exceptional grass, but limited water yields; water is mainly found at Dukana and Eel Hadi, but supplies are limited during droughts; Dukana, Chariashe and south or southeastern Chalbi are dry-season grazing areas.*
- d) Lake Turkana shore, from Derati, Gas/Gallas, Koromto, Sibilo: it consists of lakeshore grass plains interspread with lava hills and shrubs; it is sparsely grassed, with permanent water at Gas/Gallas, Derate, Karsa and the Lake. The area is used during severe droughts.⁹⁵*

As observed by the mission team, the vegetation around the main settlements/towns had been negatively impacted, because formerly mobile households now permanently settle around or near water or trading points and services like education and health. Some families around the settlements only keep from one to three camels and some shoats, just to provide milk.

The information about vegetation health, gathered during the field mission, was scanty and not scientifically sound. We strongly recommend from the very beginning to provide the OH project with botanical and ecological expertise about the vegetation involved in livestock feeding behaviour and protein need. For instance, there is need to identify and follow-up – with the TriM's activity by mobile cell-phone apps used by trained personnel and pastoralists (human sensors) – specific 'sentinel plants' to check condition throughout seasons of all fodder-vegetation types: grasses (stems and spikes for grazers like cattle and sheep), shrubs (low branches and leaves for browsers like goats and dromedaries) and trees (canopy leaves, mainly for dromedaries). For this purpose, it is possible to utilise the traditional 'pasture-scouts' (aburu) to monitor quality and quantity of vegetation from a pastoralist's point of view, and then rely their information to a centralised point. By this, the project might have ground-based information about growth variations in branches and leaves, bark thickness and colour, leaf- and fruit-production, new patches of barren land compared to new grass colonisation, among other parameters suggested by the aburu.

Indications about availability and condition of pasture are an obvious tool to enhance resistance/resilience in pastoralists' health control of their environment, but non-accessibility to grazing land is a sort of 'environmental disease' in the perception of pastoralists. Therefore an accessibility-to-pasture map should be sketched by the OH project to complete the three domains of One Health.⁹⁶ Also special environments (sacred areas, buffer zones, disputed hotspots, hazard-prone vegetation associations, unhealthful ecosystems, others) should be dynamically mapped.

4.4.2 – CLIMATE AND WEATHER

At the North Horr base, every morning the mission team observed and registered variations in wind direction and strength; shape, colour and movements of the clouds; temperature (perceived, not

⁹⁵ From Kurewa AG (2018), *op. cit.*

⁹⁶ As a reference, use Map 15, "Ratings of restrictions in accessibility for livestock regarding landforms and soils", by GTZ-Ministry of Livestock Development of Kenya (Nairobi 1988), *op. cit.*

measured). We were waiting for rain, just like did the pastoralists. Local climatic variability and erraticity, so typical of the weather system in the PA, made to pieces our obsession for precise forecasting, data regularity, trend-assessing, shape repetitiveness, and so forth. An ‘anthropology of clouds’ – dealing with human attitude towards climate and weather – is almost impossible around North Horr.

At Eel Isaako Malla (October 10), Guyo (‘Sunset’) Yattani (M), aged 61: “The wind for *haggaya* [October-November rains], is coming from the North. Before April rains, the wind blows from the East. To forecast the weather we used entrails reading (*marumaan*), practiced by specialists. Just after the rains, we send scouts (*aburu*) to find the best grazing areas, checking their location, quantity and quality. Look at the clouds! That is the white sun inside a black cloud, the brilliant eye-of-the-storm!”.

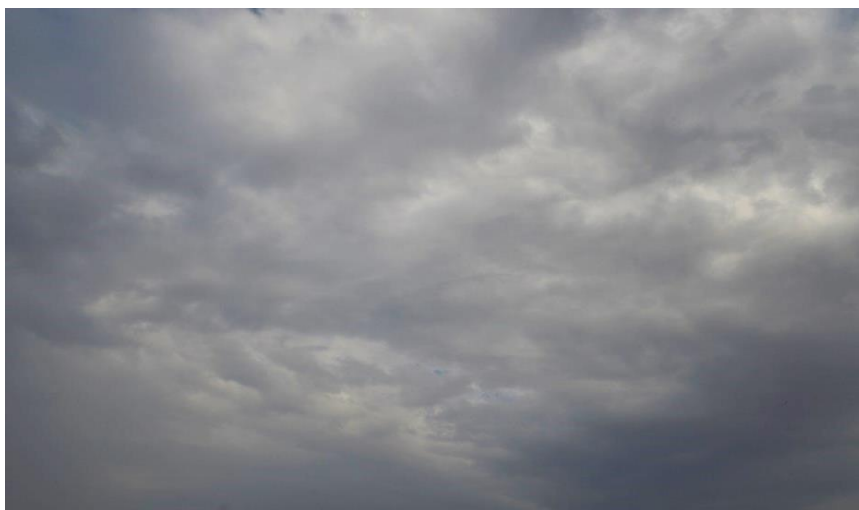


Photo 10: The ‘eye-of-the-storm’ over Eel Isaako Malla (courtesy by Kurewa)

At Goricha (October 11), Bokayo (‘Rain’) Roba (F), aged 50: “The rains are coming when you look at the clouds and see changes: they get dark or become mixed with white clouds. The wind from the north is also another indicator for the rains in this season. Everybody knows about clouds and wind as signs of rain: this is common knowledge. But the reading of the entrails is also an important way to predict the incoming rain. However, while there are specialists who are knowledgeable to check the animal intestines for signs of rain, nowadays we don’t believe in the practice any more [laughs]”.

At North Horr (October 12), Salesa (‘When the village had been for long in the same place’) Guyo (M), aged 74: “The preferred pasture for camels is *baarat*, a low bush [unidentified]. Before twenty years ago there was a lot of *baarat* in a place behind a northern hill called Dabaadabale, but now... What does *baarat* need to live? [laughs] Me-oh-my, life is from *roob*⁹⁷, rain, of course! Rain comes from the clouds (*dumas*) that are to be found in the sky. God and the sky make the clouds [no water cycle recognized]. Excessive air temperature at ground level, with increasingly hotter days, that is another sign of incoming rain. A white sun inside black clouds is one more sign the rains are near. At the moment, clouds are giving us some hope of rain. Wind can sometimes change direction, just before rains. Wind is *killes*, but we have also *bube*, a whirlwind so strong it can take animals and huts with itself. The worst drought I remember was the one of 1984, that the Gabra call *Baadalla dima*, ‘when they brought the yellow maize’ [food aid]. In 1997 there was such a drought to lead to a horrible episode in Kokai: a massacre was perpetrated by the Daasanach, therefore that year is called Kokai. Very bad years were also 2016 and 2017.

At North Horr (October 13), Ibrae (‘Sunday’) Jillo (M), aged 58: “Climate change is felt by everybody as an increase in temperature and reduction in the rain quantity and reliability: rains were much more regular and consistent before. Weather forecasting is left to ‘future tellers’ that can read the clouds for signs of rain. Entrails reading is also used, like the ‘sandal throwing’ we utilise to divine future events of all kinds. Livestock behaviour is attentively observed: for instance, if camels drink little and fast at the well-trough, it means rains are incoming. The small night-bird *bararato*⁹⁸ chants signalling rain”.

⁹⁷ The Gabra use two words for rain: *bokaya* (physical) and *roob* (conceptual), this one being more of Borana use.

⁹⁸ A rare unidentified small bird, variously described as black and white, brown or yellow, calling at night; see Tablino P, *op. cit.*; p. 280; we made it the hero of a story to introduce climate and the water cycle in the North Horr primary school (see Appendix A).

At Kanacho, (October 15), Chuluke ('Shining eyes') Molu (F), aged 50: "You want to know about changes in the environment and climate? Although droughts have been there since long-time past, the present conditions are getting worse. A number of different types of grasses were in plenty and these included: *lamisho*, *agagaro*, *buyo* [unidentified]. Now these grasses are still available, but they are not in plenty as they used to be. In this arid land, when I was a child there was a lot of pasture for all the animals. Myself, I was looking after my family's shoats. The grass might come back with the rains, but in smaller quantity. At the moment, all our animals are away because of lack of pasture. Now they are as far as Koromto, Gas/Gallas, Galana, Sirima, Derati. Some families keep from 1 to 3 camels, plus some shoats in the *olla*, just to provide milk. Sometimes, these animals lack milk and, as a result, the inhabitants have to buy milk from North Horr".

At Dukana (October 16), area chief Tuye (M): "We are in a drought, at the end of the dry season. Can your team assist me in knowing when the rain will come? On your smartphones I see there is a bit of uncertainty: one says next Monday, the other Friday. The elders here want to join the bet, but they see no signs of rain around".

At Eel Hadi (October 18), chief Salesa Adano (M): "Notwithstanding the lava rocks all around, grasses like *buyo* [possibly *Tetrapogon cenchrifomis*] and *agagaro* [unidentified] are abundant during the rainy seasons. But we had none during the long drought of 2016/17, called *ola isnin*. After that, we got good, long rains. Well, climatic variation brought a lot of death among our livestock, above all from diarrhoea and bloating in shoats. With the elders we tried to design a partition of grazing areas to survive through the dry periods, but our rules were only partially followed by the herders".



Photo 11 and 12: Drying buyo (left) and serim (right) grasses near Galan Hill, south of Dukana (courtesy by Kurewa)

At Durte (October 23): Guyo Mamo (M): "We have no special signals to detect rain: we refer to our calendar for that. All *mana*⁹⁹ have a mobile phone and network is active everywhere: nowadays we use the telephone to receive news from our scouts looking for the last pasture remaining before the incoming short rains". (For the massive infestation around this settlement by *kobbo* and *algarroba*, see 4.4.4)

At Daga Boji (November 03), Jihike Jibba ('Born with full moon') Bulo, very old: "I detect rain from Eel Beso: it comes when there are rains in Ethiopia. But for pasture, we all go west".

At Eel Beso (November 04), Molu ('Bald') Boru (M): "If we see no flowers on acacias, there'll be no rain. So no grass, and then livestock shall be lost if we don't see any rain before December. By then, the possibility of a rainy season will be lost, finished. Clouds? Water drops congregate in clouds. Why clouds are white? I don't know, but if the bottom of the clouds gets black, they are bringing rain. Look at them: for the moment, they predict small rains".

At Eel Beso (November 04), various elders (M): "If we have to choose between a very strong rain lasting two days, or a gentle rain for a week, with the same amount of water falling to the ground, we say: a) 'If we are thirsty, very thirsty, I swallow my water in one go, but as far as the rain is concerned, it is much better to have gentle rains for some days, instead of one or two ruinous showers'; b) 'Even better is the rain that comes in the morning, because the humid earth keeps the surface water, favouring grass germination'."

4.4.2.1 – REMARKS AND SUGGESTIONS

Considering the climate and weather environment when related to human/animal sets, we suggest to gather life-stories (archaeology of behaviour) and oral traditions about the occupation of the area by the Gabra and its toponymy. They contain narratives of past environment/climate/weather related incidents

⁹⁹ 'Household': a main domed hut plus annexes like additional huts, pens, chicken or lamb houses, stores.

like floods, droughts, bush-fires, epidemics, locust invasions, tick infestations, and so on. Ticks and insects are particularly interesting as climate indicators, because their reproduction and diffusion is correlated to precise levels of humidity, temperature and elevation. To give an example about how an extreme event leaves traces in the landscape – not only physical, but also cultural – we report that near Malabot (October 11) we forded a wide lagga called Baasgubatu, meaning ‘Burnt by a great fire long time ago’. Why such an event left an indelible sign on the historical landscape? We did not investigate, but a map with clusters of perceived and related incidents in the environment should be drawn and updated.

Another source of information, to be explored, recorded and updated, lies in the media that report past and present incidents about human-animal health in the PA’s environment; even the Health, Livestock and Environment institutional archives at sub-County level are a source of past and present information, providing hard data and statistics. All this information must be stored and updated by the project, to be consulted whenever incidents related to One Health (like verified epidemics, water pollution/poisoning, outbreaks of livestock diseases, drought alarms, etc.) occur. With this activity, beyond its uses for human and animal health, it becomes possible to deal with what the editor defines the ‘immaterial environment’; with an appropriate technology¹⁰⁰ and knowledge-base (data-base plus its management), the environmental-incident map (mental and physical) becomes a reference ‘digital terrain’ for future activities in the PA. Such a map is the terrain-baseline of all cultures and a tool to deal, among other, with climate change.

4.4.3 – CLIMATE CHANGE

You are walking on *kurkur*: small, black lava stones over a flat yellow sandy plain to the horizon. You have to choose: look where you put, carefully, your sandals, or lift the eyes to the sky, looking for signs of rain. Maybe it’s a bit hotter, and the season’s too late, but your thoughts are far from global warming and climate change.

Like most of the Earth inhabitants, notwithstanding evidence from their environment, the herders around North Horr appear not to pay much attention to these global issues. During the mission, the editor compared the situation to what he experienced in the Somali Region of Ethiopia, inside a similar environment; up there the impression was that the climate change topic was more media-related than actually perceived by the herders, who used the sentence “It’s all the fault of climate change” more like an alien mantra than effective local knowledge.¹⁰¹ During our mission, at Dukana (October 16) we were informed that three days before our visit, a semi-blind man who reads the entrails had an argument with his son about whether the coming rains will be short or long. While the son predicted that the rains are going to be short, the old man argued that, to the contrary, the rains will be long. This uncertainty – even if intrinsic to the PA environment – is not a trivial matter: the discussion among father and son may be related to climate change. During the CCM organised One Health Conference on 13 November 2018, Ingrid Vigna (research fellow Uni.COO for the OH project) and Velia Bigi (DIST, partner to the OH project), after a climatic research in Kenya showed that in the North Horr area the two rainy seasons tend to equal values (see Chart 1). The decreasing differential in rain precipitation is a warning about a deep change in local climatic conditions, possibly affecting the growth of seasonal grasses and shrubs. Throughout our mission, pastoralists rumoured about a “lack of nutritional power in some fodder plants”.

The vegetation is one of the best medium to observe changes in the environment, because plants respond quickly to temperature and humidity variations, much more than people and animals. Plants do not have a choice in the strategies of pastoralists and livestock: the ethology options ‘flee-or-fight’ are not for rooted organisms.¹⁰²

¹⁰⁰ See TriM’s and DIST’s methodological framework and missions.

¹⁰¹ Salza A (2018), *op. cit.*, pp. 3-4.

¹⁰² Coughenour MB and Ellis JE, “Landscape and Climatic Control of Woody Vegetation in a Dry Tropical Ecosystem: Turkana District, Kenya”, *Journal of Biogeography*, Vol. 20, No. 4, July 1993, pp. 383-398.

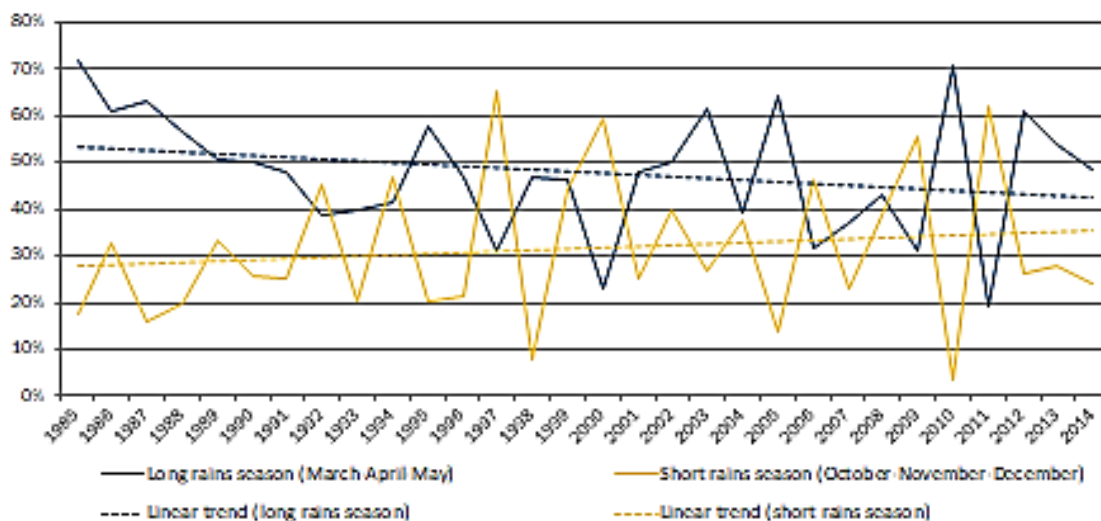


Chart 1: Distribution of the precipitation during the year, North Horr 1985-2014 (by DIST)¹⁰³

At Durte, a location near North Horr composed of 127 *olla* (at an average of 6-7 people per household, the population ranges from 762 to 889 individuals), on October 23 and 29 their head Guyo Mamo pointed us to a significant change in the vegetation, possibly connected to climate change. The location is named after *d'urte* (*Suaeda monoica*) a xerophyte plant, drought- and salt-resistant, that provides good fodder for dromedaries at the fringe of salty pans like the Chalbi.

Guyo Mamo identifies *kobbo* (*Calotropis procera*) expansion as one of their main problems. He shows us how its fruit and seeds work in colonizing the areas where good grass was growing during previous years (the plant is growing very fast on floodplains, see photo 13), attesting good scientific local knowledge of seeds and growth in plants. The problem started five years ago, with floods bringing the seeds along and providing a good environment for *kobbo*, killing the local grass thereafter. "Animals eat their seeds when hungry, without getting problems, but nutritional values are considered poor", he says. Its sap was formerly used against ringworms in children by rubbing it on their head, but nowadays the practice has almost disappeared.

The *aba olla* says that, if financially assisted, they would get rid of *kobbo*, but at the moment they can do nothing against it. They are planning a sort of earthen trench to prevent the flooding water of the *lagga* that provides nourishment to the *kobo* to reach grazing lands: by diverting it they might recover good land for pasture, but again they need assistance in terms of tools or finance. "Our entire settlement has been moved away because of these environmental issues: it'll be the end of the *d'urte* fodder and place", he says (see photo 14).

We walk to reach the up-drainage limit of the *Calotropis procera* invasion. The water flows from Kolongos into the Chalbi, and some outlets were recently opened by excessive rains (like the 2018 long rains). We are shown that beforehand the *kobbo*-invaded area was covered with the typical association of *Indigofera spinosa* (*kiltippe*, some overgrazed bushes are still visible) and two species of *baddan* (*Balanites aegyptiaca* and *rotundifolia*: good camel fodder notwithstanding thorns, and their small olives are edible also by humans).

The abnormal growth of *kobbo* is confirmed to be only a few years old: a plant reaches 2 m of height in two years, sucking up a lot of water. Apparently, livestock adapted to its slightly poisonous sap¹⁰⁴, but they would be much better with *Indigofera* and other small bushes, like the *mogorré* (*Tribulus terrestris*)¹⁰⁵, a low growing plant that, after rains, has large primrose-yellow flowers (we manage to see one survivor). "It

¹⁰³ Bigi V and Vigna I, "La ricerca sul campo: analisi del contesto geografico-climatico", power-point for the CCM-organised conference *One Health, relazione tra salute umana, animale e ambientale*", November 13, 2018, Campus Einaudi, Torino.

¹⁰⁴ In the Sahara desert, the sap is used by Tuareg as an external antibiotic, as witnessed by the editor.

¹⁰⁵ In the Sahara desert it is called *cram-cram* and marks the southern limit of camel breeding.

is good fodder, but when dry it has unpleasant spiky seed-pods;”, says Guyo “anyway it would be excellent for our shoats¹⁰⁶, but now it has almost been wiped away in a 3 year time”.

The *kobbo* extension is impressive all around. We are shown many rain-fed outlets, directed towards the settlement, where the only standing vegetation is *kobbo*. We climb a small dune, to have a 360° vision. Among the thorny *baddan*, a dwarfed *Salvadora persica* (*aade*) is opening its way. Small branches that are used as tooth brushes (they contain fluoride) are picked by Guyo and distributed to everybody. “One twig can be payed up to 20 Ksh in North Horr” he says smiling in his generosity.



Photo 13 and 14: *Calotropis* invading the dry river (left) and (right) pushing away d’urte vegetation and settlement alike (courtesy by Demarchi, TriM)

A second environmental issue – in Durte, Goricha, Balal, Eel Beso, Hori Guda, North Horr, all over – is the infestation of *algarroba* (*Prosopis juliflora*), a problem shared by other communities of the PA. The plant, looking like an acacia, is infesting the Durte area coming from the south, where two wells are located: it encroaches the land, impeding the passage of animals and people, and preventing livestock to feed on the grass under it. Its pods and leaves are eaten by livestock, but they do not give nourishment like other plants. “One of our wells is almost unreachable because of its thorns”, says Guyo. In fact, these thorns are infective, and our CSH confirms that he saw a camel dying because of a foot infection by a thorn-prick. Even the *lagga* at north of the settlement is being infested, to the point that animals find problems in foraging. Anyway, we reach the limits of the *algarroba* encroachment, which appears less extended than *kobbo*. Total eradication of *Prosopis* might not be the only answer, considering the economic value of firewood and charcoal in the PA¹⁰⁷, but the local perception is against changes in the fodder plant availability and not in favour of money returns: to buy what, grass?

We need scientific support, but the hypothesis that the encroachment of these two plants is connected to recent climate changes is sound, above all if connected with variations in the night temperatures index TN10P (evolution of the percentage of cold nights), recommended by the World Meteorological Organization (WMO) as significant for climate change trends (see chart 2). Although the long-term trend is towards decreasing values (black line), after year 2000 the minimum temperatures (dotted line) are significantly increasing as a trend. Night temperatures may trigger livestock diseases like anthrax, that is temperature-sensitive (above 15.5 °C).¹⁰⁸

¹⁰⁶ Conventional writing for ‘sheep and goats’.

¹⁰⁷ For a comprehensive discussion about the eradication vs. utilisation of *algarroba* in Kenya, see Choge SK and Pasiecznik NM, “The challenges of eradicating *Prosopis* in Kenya”, HDRA, UK 2005; further info in Kahuria C, “Demystifying *mathenge*: Unlocking economic potentials of *Prosopis juliflora* for dryland people”, Kenya Forest Service, June 2015, at <http://www.kenyaforestservice.org/index.php/2016-04-25-20-08-29/news/419-demystifying-mathenge>; lastly retrieved on February 07, 2019.

¹⁰⁸ Source by DIST: Bigi V and Vigna I (2018), *op. cit.*

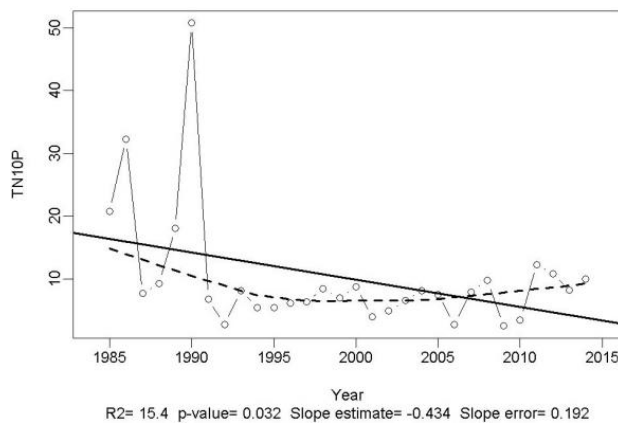


Chart 2: Value of TN10P, North Horr 1985-2014 (by DIST)

At Hori Guda, the main water point near North Horr (October 28 and November 03), we faced a different issue, even if the elders confirmed the encroachment by *Prosopis* around the town, connected to changes in the climate (temperature and humidity). The elders point out the reed situation in their water point, where the infesting reeds (*Typha* sp.) are thought to have been brought to the place by some European project. They think it was French, but we must consider that *ferenji* (from the word “French”) in Ethiopia means ‘foreigner’. “The water is palatable [tasted] and not salty, but these reeds! We need disinfection, or at least cutting of reeds”, one says. “And a better fence around: once there was a watchman to chase away animals and people alike, but this was so costly that we abandoned the practice some time ago”. The fence is now full of holes to permit people to get access to the water at the top-end of the pool (see photo 15). Outside the fence, a great number of camels are taking water from an extended cement trough, once connected to the nowadays broken (so we are told) pump (see photo 16).



Photos 15 and 16: reed infestation (left) and algarroba encroachment (right) at Hori Guda water point (courtesy by Demarchi, TriM)



Photo 17 and 18: human consumption pool (left) and camels being watered (right) at Hori Guda (courtesy by Demarchi, TriM)

4.4.3.1 – REMARKS AND SUGGESTIONS

Greta Thurnberg, a 16 year old Swedish girl, said: “Some people say that we are not doing enough to fight climate change. But that is not true. Because to ‘not do enough’ you have to do something. And the truth is we are basically not doing anything”.¹⁰⁹ The pastoralists in the PA follow suit: they are not doing much about climate change, if not rearranging pastoral routes or evolving avoidance strategies against infesting ‘new’ vegetation. As the editor wrote before (2.5), world pastoralism itself might derive from coping strategies in a changing environment. Pastoralists, in their nonchalance towards climate extremes, look like the best equipped to deal with climate change. At the moment, though, in Gabraland long-range pastoralism is being substituted by the polarisation of sedentary home-bases and long-distance forays in search of ‘new’ grazing areas (fora camps), with a lot of environment pollution (concentration of waste, plastics, chemicals, dip treatment for livestock, etc.). In the meantime, variations in temperature and rainfall are tending to values never experienced before, even if, in a dryland where only few drops fall in a rainy season, a drop more or one less may appear to be insignificant, just like a decimal of heat in the scorching sun. But in a non-equilibrium environment, threshold levels are very sensitive: livestock and plants may be at their endurance limits, even if people do not perceive it.

Therefore, we suggest the project management to follow up any initiative by the pastoralists in the PA tending to all forms of control of the environment, even if minimum. For instance, in Durte, regarding the Calotropis and Procera expansion, we discussed at length the possibility to deviate somehow the new rain-fed outlets (Calotropis is a wet-area plant) towards the west, where the original course of the lagga previously was. The men of Durte, already registered as a group, are ready for any project dealing with plant-encroachment.

A contemporaneous economic use of algarroba is going to be proposed in 4.5. A probing-project¹¹⁰ of this kind might enable us to monitor both the environmental responses and the change in attitude of the settling pastoralists. Analogously, an assistance in managing the Hori Guda water-point might enhance decision-making and communal control of resources, demonstrating the falsity of the “Tragedy of the commons” stereotype among pastoralists.¹¹¹

In order to help assessing and monitoring events and zones particularly involved in climate-change, the eco-chronology of the PA must be recorded and updated by the project personnel and by pastoralists (trained human sensors) in specific knowledge bases. An approach to this activity lies in the naming of the years in the Gabra calendar.¹¹² As reported in 2.3, Gabra years are named after week’s days. To tell one from the other, after a cycle of 7 a ‘nickname’ is added. For instance, the year that started during our mission is Arbaa, ‘Wednesday’; an elder explained that “to tell one from the other, the Wednesday year before this one was nicknamed ‘Wednesday Year of the Drought’”. This naming system should be furtherly explored and aptly recorded on climatic historical and chronological maps, in order to get and develop a flow-chart of ecological variants. Data about a calendarisation of extreme climate/weather events may provide a viable tool to individuate, in this Gabra ‘environmental chronology’, all meteorological cycles and ‘oral traces’ of climate change during an extended time-span. Some OH personnel should be dedicated to this specific data collection, monitoring and analysis, in order to visualise trends and clusters of events related to climate change. Without ‘boots on the ground’ there is no chance we may understand the change of landscape and human/animal terrain under the pressures of climatic evolution.

¹⁰⁹ Video of 2018, in <https://twitter.com/gretathunberg/status/1087779799639175170?lang=en>, lastly retrieved in January 2019.

¹¹⁰ The concept was ideated by the editor in 2000; such a typology explores by controlled perturbation the local system, offering an immediate return, economic or ecologic, to the population and a feedback image of the relevant SES (positive double output strategy).

¹¹¹ Reference to a famous, but controversial, article by Hardin G, “The Tragedy of the Commons”, *Science*, Vol. 162, No. 3859, December 1968; pp. 1243-1248.

¹¹² A Gabra chronology with year names from 1856 to 1997, from which to derive significant events in the environment (from droughts to floods, from epidemics to conflicts), is in Tablino P, *op. cit.*; pp. 175-212.

4.4.4 – WATER

By both philosophy and biology, defining life is an almost impossible task.¹¹³ Anyway, all scientists agree that water is the catalysing factor that *always* connects the life in the three domains of One Health: people, animals and ecosystems. To understand what a 'healthy' water is inside the One Health terrain, we had to pass through a multi-level matrix, from local water taxonomy to systems of retrieval, from management rights to cultural biases, from local knowledge about the relationship water/disease to pollution and poisoning. In the water domain, vision, smell and taste count more than words, making a report about water complicated.

From the mission field-notes: "October 10, at Hori Dika (approximately 'small water point for livestock'), with running – but salty and smelling – water. Good for camels and shoats. At the moment nobody is around, because the watering of animals starts around 10 o'clock AM. The vegetation is the typical 'oasis' association of North Horr area (photo 19), with *Hyphaene compressa* ('doum palm') and a carpet of spiky *chilladu* grass (probably *Sporobolus spicatus*). At the moment there is a fair amount of water running to the Chalbi desert, which is quite near, less than a kilometre. This point is impassable by car during both rain-seasons". The image is a synopsis of the idealised water concept for visitors in a semi-arid land: a green carpet of vegetation and the miracle of water inside a barren desert. The pastoralists read the landscape differently: water points are spaced stations along their pathways to grass: protein grass, with nutritional seeds. Colour does not count.



Photo 19: Hori Dika with running water, near North Horr (courtesy Demarchi, Trim)



Photo 20 : Elema fetching water from a hand-dug well (courtesy of Kurewa)

¹¹³ Fox SW, "A definition of life derived from synthesis of protolife", in Rizzotti, M (ed.), *Defining Life. The central problem in theoretical biology*, University of Padova, 1996; pp. 6-75.

Just after this idyllic panorama, we met Elema ('Born while people are milking'), 68 years old, busy fetching water from a hand-dug well inside a dry river-bed (photo 20). He is filling two 20 litre jerry-cans, to be carried on a donkey: they must last some days for the whole family. The water looks sweet and clean (it is naturally sand-filtered), with a strong flow, while Elema is clearing the sand to reach the water.

Some miles after this encounter, we get to Eel ('well') Boru Magatho (also spelled Magado, from *magaad*, natron salt), where we meet the *aba olla* Barile (Dawn) Guyo, 70 years old. We reach the 'singing wells' that the Gabra term *tula* "because they are deep wells with a lot of water, that must be lifted up [*tulu* means hill]".

These deep wells (the water is at 8-10 m during droughts) are 'operated' by 3 to 5 person-pairs, one on top of the other. The flow of water from the table is controlled by the song rhythm of the human chain-elevator. From there comes their name, but there is no poetry in this all-day-long water-fetching (in Ethiopia, near Mega, the editor had previously experienced the labour). The widespread use of this water-lifting technique is confirmed at Kancharo (October 12), where we see dromedaries and shoats being watered from a singing well. The environment is oasis-like, with palms and tall acacias of many species. This rehabilitated well (its walls consolidated with concrete) is used both by people and livestock. The water in the shoa trough is quite green and smelly. Inside the camel well, where they are now busy, three couples of men lift the water with plastic containers (20 l jerry-cans, modified) to an intermediate circular reservoir, whence the flux of water to the trough is controlled by a person with a cloth stopper. The lifting couples sing while taking water, so that their rhythm controls the inflow to the trough, on demand (man with the stopper) and just in time, like in a Japanese car factory (avoid storage and waste). Some 30 camels are presently being watered.

In the PA, water for human and animal consumption is available in differentiated situations:

1. Open springs and sources (not so rare as one might suppose), with rights of access to be negotiated with the resident community.
2. Permanent ponds (rain fed) with free access to the whole tribe, but not to strangers.
3. Permanent surfacing water of various origin: volcanic like near Lake Turkana (e.g. at Gas/Gallas), or deposits of ancient lakes (oasis of North Horr); or watershed valleys like Furaful; access is locally regulated (authorities or resident clans), because this situation leads usually to urbanism.
4. Semi-permanent ponds (rain-fed), with territorial rights of access (mainly clans').
5. Hand-dug wells, semi-permanent (e.g., at Dukana), to be found inside the *lagga* or in particular geological features (e.g., at Eel Hadi); rights of access are to the man or family who excavated the well.
6. Seasonal pools and ponds, rain-fed, lasting for very short periods and used by whoever is allowed inside a specific territory.¹¹⁴
7. Running water inside the drainage system; only during rainfalls; free access if there is no conflict or feud.
8. Boreholes to deep water-tables, with access controlled by the sub-County, local leaders or the implementing organisation (NGO, mission, government, etc.) and not by the consumers' community.
9. A buffer water reservoir is the alkaline Lake Turkana, at the western limit of Gabra territory; the area is used during droughts or for the salt-cure for livestock.

During our mission we confronted the above classification with the local taxonomy and managed to have a list of recognized water points and sources for human and animal consumption:

At North Horr (October 11), Salesa ('Born when the village had been long in the same place') Guyo (M), aged 74:

1. *Dolollo*, a rain pool that can last from 2 to 7 days.
2. *Dambala*, a rain-fed pond surrounded by stones and soft grass (*santu* or kikuyu grass), lasting 2 or 3 months; the water point is wider than in Hori Dika (permanent), but not running.
3. *Haro*, hand-dug well, traditional style, very wide so that the animals can reach the bottom to drink, like in Eel Beso; if rains are abundant, it can stay throughout the year, but the water can finish before new rains come;

¹¹⁴ Permanent water points can be killers; in AA VV, *Management Plan A-6*, IPAL-Unesco, Nairobi 1980: "If the well is permanent, severe damages are almost unavoidable. The damage increases non-linearly with the amount of available water, so that additional wells at the same site would increase this effect. It has been shown all over the world that the abundance of water favours human sedentarisation and thereby accelerates desertification".

it can have poles and structures to maintain the accessibility for animals, just like some Borana wells in Ethiopia; nowadays, because of too many animals or for protection, a wooden fence might be erected.

4. *Garb*, a spring in between two rock escarpments, where water is permanent.
5. *Gof*, a crater lake filled during rains.
6. *Gootu*, basalt rock water-catchment, lasting 7 or 8 months, like in Karsa (near Sibilo) or Moti (near Gas) or Nuno, near Eel Beso.
7. *Hada*, a hand-dug well in a riverbed (fresh sub-alvear water), like we saw in *lagga* Burra
8. *Eel*, a hand-dug well with some classification, including *balesa* or *had*; the 'singing well', deeply dug in *lagga*, reaching the water table in river-bottom rocks, can be called *tula*
9. *Galana*, general name for any permanent water or 'lake'; word used for the water in Lake Turkana.
10. *Har*, earthen dam.
11. Borehole, drilled by Government or NGO and usually run by the community¹¹⁵.

Opposing to what one may think, water is more a problem to sedentarized herders than to long-range nomads. At the Durte settlement (October 29), Roba ('Born during rains') Mamo Wario, one of the elders who can speak English, has a notebook for incoming NGO, with names of their registered group and elements of the community to be helped, like blind or lame or variously disabled persons: an elder without his right foot is sitting near the editor. Their notebook indicates priorities previously identified: 1) water; 2) health; 3 education; 4) road; 5) blockage of rain rivers; 6) cutting of *kobbo* and *algarroba*;¹¹⁶ 6) market). Water is Number One, whatever the editor, other anthropologists and hydrogeologists may think of it.

4.4.4.1 – Water-telling

As one who knew arid lands, in 1292 the Persian poet Sheik Sa'di wrote: "The form of man was attained by a drop of water".¹¹⁷

At North Horr (October 13), field-notes by the team: "At a site called LDC there is a windmill pump (*kijito*). It is the oldest water point in North Horr Town, near the former British colonial resident officer (DC). What is visible dates back to 40 years ago and consists in cement reservoirs, from where the water is pumped to an elevated position and then redistributed by gravity piping to 4 quarters in town. Families pay a fixed fee of 50 Ksh per month. Inside the neighbouring vegetation there is an open cement reservoir where we can see the water table being very high, but polluted by insertion, from people or wind, of all sorts of pollutants. The high water table poses serious questions about hygienic practices and sanitation: all toilet products may reach the water table with a short course and little natural purification".

At Kanacho (October 15), field-notes by the team: "On our way to the settlement, we see a number of women leading a pack of donkeys loaded with water from the Hori Guda spring¹¹⁸ in North Horr (about 12 km far)".

At Kanacho (October 15), Adano ('Friday') Guyo (M), head of 57 *olla*: "I've been living here 11 good years; we came from Kanangos because of shortage of water and pasture. The only water we rely on comes from Hori Guda, where the water is salty for you, but not for us. Women fetch water every two days, leaving before sunrise and being back before sunset".

At Dukana (October 16), a man busy fetching water inside *lagga* Wata: "This is Abdullahi Abdi well.¹¹⁹ We Gabra are very concerned about our names being remembered: what a better occasion than digging for water in a barren area? Abdullahi was the first to excavate; so he is the 'owner of the well' and everybody should ask permission from his family before fetching water, even if this is usually granted for free, in any case. The well gets full of sand

¹¹⁵ The introduction of government funded boreholes lead to abandonment/erosion of traditional systems of water management, leaving a gap in prudent use of water resources.

¹¹⁶ This issue is treated in detail in 4.4.4.

¹¹⁷ Sa'di, *Gulistan: The Rose Garden*, 1258, Ch. vii, story 11.

¹¹⁸ At Hori Guda the hand pump is not functioning; the water point looks like a spring, but the water is stagnant, with different water-grass, weeds (mainly of a *Typha* sp.), and other vegetation, inside an oasis-looking environment, fenced.

¹¹⁹ Inside the wide Dukana *lagga*, where the vegetation is riverine with acacia (*wanga*), thorn bush and mixed grass. In front there is a flat area with *Acacia reficiens* on red volcanic sediment, topped with lava small rocks. At east there is a range of volcanic hills (*tulu*, amba-like).

after rains; so we have to reopen it every season. The family has also a pump and a generator; if the case, people using it should pay a fee for fuel and maintenance.

At Dukana (October 16), a woman fetching water at the top reservoir¹²⁰: “I and the other women fetch two 20 litre jerry-cans per household, taking turns with the other families remaining at the *olla*. Transport is made by donkeys, each with 2 jerry cans. This water is used for drinking, cooking and washing; therefore we have to come every day. The distance is 4 hours, one way. Only shifts can sustain such a continuous flow of water. In my household there are a husband, me and 7 children: therefore 40 litres are quite insufficient even for one day. I live in Kubi Qiltipe”.

At Galan Hill (October 16), field-notes by the team: “Grant’s gazelles rest under sparse acacias. They look confident and are not afraid of the car. Their presence might signify a liminal area between two watering systems for pastoralists: grass is still available, but far from Dukana or Balesa water points; so livestock leave a niche open to the gazelles.¹²¹ The vegetation association is called *Dida* (‘plain’) *Gola* with two types of grass, *serim* and *buyo*.”

At Eel Hadi (October 18), John Iya Ibrae (M): “The available 40 shallow wells last for about six months. Ten of them do not dry up during drought periods. A borehole is managed by the Government, while the solar pump is provided by an NGO”.

At Eel Hadi (October 18), field-notes by the team: “In a north-to-south depression between two lava outcrops, Solidarités International, a French NGO, fenced an area to guarantee fresh pasture throughout the year. The place is called by the Gabra *Dossa-bissan-kijibo*, the ‘depression of fake water’, showing some grade of ironical attitude towards the place. In fact, all grass taking over on the previous grass is of a non-edible type. There is a lot of water, but apparently it can stay only for a short time. The place looks astonishingly green, but is of no use to the herders (photos).



Photos 21 and 22: ‘Depression of fake water’ (left) and its infesting plant (right); compare the bareness of the surrounding landscape and the dry fodder-bush kiltippe (*Indigofera spinosa*) in the foreground (courtesy by Kurewa)

At Balesa (October 18), a woman along the road, after the first rain shower of the season: “Go slow! Don’t you see we are fetching water from the pools on the track?”

At Eel Beso (October 22), Abudo (‘Saturday’) Ibrae (M): “We fetch good drinking water (*bisan qabanayo*) inside the *lagga*, but the water from the borehole is salty;¹²² so we use the wells and animals the borehole. Because only 5 of the rehabilitated wells are permanent [the others get covered by sand after rains], we would like to have a water kiosk. We have a water manager to whom whoever comes looking for water must ask for permission before watering livestock”.

¹²⁰ That way, the same water for animals is used by people, confirming intimacy and lack of difference in their relationship.

¹²¹ See Map 19, “Distance to permanent water and estimated daily water yield in m³/day”, by GTZ-Ministry of Livestock Development (Nairobi 1988), *op. cit.*, where a vast zone between Dukana and North Horr is void (more than 15 km); the distance between forage area and water source is influenced by the watering intervals for livestock types: camels are watered every 14 days, shoats from 3 to 5 days, and cattle every 3 or 4 days; these watering schedules enable livestock to graze in different areas of the range unit.

¹²² The hand-dug wells reach a sub-alvear water flowing from as distant as the Ethiopian plateau, while usually the boreholes dig so deep to break the saline subsurface, reaching the salty water table (e.g., a similar case was registered in Daga Boji, November 03, and another was reported by the editor in Kuralle, Filtu, Somali Region of Ethiopia).

- At Durte (October 23), a woman fetching 20 litres of water: “This well is called Eel Dalacha; it is the name of a person, meaning ‘Born when his parents were old’; it’s deep: a permanent well with five steps. It yields good water [tasted]”.
- At North Horr (October 27), field-notes by the team: “Just before the floodplain formerly used as an airport, there is the slaughter house, with most of its by-products abandoned very close to the water table, only one meter deep. We see a destroyed concrete pit latrine being left open, with shallow water inside and lots of pollutants”.
- At Hori Guda (October 27), field-notes by the team: “There is a hand pump, broken down. Women and girls are fetching water, only 2 m deep, directly from an opening in the concrete cover. We taste the water: it looks good for human consumption; it is even too sweet, lacking minerals to make it potable. Two elders ask us to replace the pump, that lasted 12 good years. A bit further there is a concrete cistern, where women are washing clothes. The water table is very high and this might be a problem for human health, because all waste (soap and dirt) goes back to it immediately, without sufficient sand filtering”.
- At Durte (October 29), Aado (‘Tooth-brush tree’) Umuro (F), aged 30: “I never heard of any relationship between water and disease. Diarrhoea? Diarrhoea might be there, but I don’t know its causes. Water cannot be bringing diseases: it is a good thing. You are telling me that you got sick in Italy after drinking contaminated water. So you say, but now I interrupt you, because I’ve got to go and fetch water. I have to carry 20 litres of water on my shoulders for more than an hour because we don’t possess any donkey [she carries the drum tied to a rope and leaning on her back]”.
- At Daga Boji (November 03), Jihike Jibba (‘Born with full moon’) Bulu (M), quite old: “We take water from that wide *lagga*; it has running water for a couple of days during the rainy seasons. For 2-3 months we manage to fetch sweet water from hand-dug wells (*hada*) in the *lagga* bed. After that, we must use the NGO deep-dug well, but its water is salty, even if good for human consumption”.

4.4.4.2 – REMARKS AND SUGGESTIONS

As we have seen above, pollution is entering the Gabra ecosystem at a fast rate. It derives from alien materials like plastic implements and clothes or dangerous chemicals like pesticides and detergents. In the meantime, the modernity-induced density of people and livestock in towns and around boreholes or permanent water points brings the concentration of faecal waste to health-affecting levels; as we witnessed during our mission, this happens mainly where the water table is almost at ground level – like in North Horr town and outskirts – or where ameliorated wells are excessively exploited – like downwards of the Eel Hadi location – with their previous natural filtering diminished by concrete reservoirs and high overtake during dry seasons, getting drier and drier.

An independent research showed that the total coliforms at one of the wells of Eel Hadi, where about a hundred camels died in January 2019, exceeds by far the 180 mpn/100ml considered the limit of safe use.¹²³ As previously discussed, at hand-dug and deep wells we have to consider water distance, frequency and quantity, and all that leads to excessive density of animal/human faecal waste. Especially during dry periods, health hazards and risks accumulate above all in the shallow water inside rehabilitated wells, where cement and depth interfere negatively with the ecosystemic sand filtering.

In the main centres of the PA, a good practice would be the establishment or strengthening of participatory forms like the Water Resource Users Association (WRUA). Besides waste disposal and processing projects – sided-up by diffused and repeated controls of the water security throughout the PA – we suggest to review with the local authorities the deployment and maintenance of toilets, pit latrines and abandoned hand-pumps in public and private spaces of towns like North Horr and Kalacha: most of the time, the polluted water-table is visible at a depth above ground level of only one metre (see photos 23 and 24).

Following these findings and many requests by informants (women, above all), we suggest also to increase and ameliorate the distribution of chlorine tablets to purify water, making it fit for human consumption.

¹²³ Kenas-Cropnuts Laboratory services, ref. “Water Source: El-Hadi Camel Water Well”, signed on February 02, 2019.



Photo 23 and 24: Concentration of pit latrines in Kalacha (left) and an abandoned toilet with a broken water pump in North Horr (courtesy by Demarchi, TriM)

For what regards the nomadic pastoralists, their use of water to dilute pesticides and ‘wash’ their animals must become of the utmost concern: sometimes they recycle discarded tins of chemicals to carry drinking water, while the environment around the pens – in direct proximity with the huts – is receiving an excessive load of dangerous chemical pollution, just where animals are milked, children play with grass and soil, and young animals are kept. An education campaign about water pollution must be designed by the project to be implemented by the local Health, Livestock and Environment institutions.

The more so, because our interviews highlighted a widespread of ignorance about water as disease-bearing. For instance, malaria, one of the most cited diseases throughout the PA, is thought by pastoralists to come from grass, not from mosquitoes that lay eggs in stagnant pools.¹²⁴ The project should disseminate simple methods of clearing those pools around households with a thorny branch to sink and drown mosquito larvae; the editor, experimented the technique in Samburuland, and we had a 30% reduction of malaria cases, without any use of chemicals or medicines.

Another point came out inside the oldest male population: kidney problems, lived as backaches, are common and recognised. Water wells should be analysed for alkaline content: many informants repeated that they get backache when drinking salty water, like the one from deep boreholes (see Barambate, October 10; Eel Beso, October 22; Daga Boji, November 03). Under suggestion by the mission Education Expert, we advise the project personnel involved by the TriM’s data collection app on mobile cell-phones¹²⁵ to take GPS data only where health criticalities are evidenced by the community, like in case of kidney problems or diarrhoea, instead of having hundreds of marked water points, all well known to pastoralists. Information by pastoralists is valuable, like in the case of the ‘fake water’ near Dukana (see photo 21): an analysis about the reason of such a toponymy might have helped prevent the Tula Well camel incident near Eel Hadi.

Like for other sub-systems of the project, a data base of recent history of incidents related to water points (cases of sickness, poisoning, accidents, disputes, with a layered map to identify collapse-prone zones in the PA) must be collected and updated from oral narratives, newspapers, official Health Statistics, informed scientists, and so forth. Via water data collection (critical location, correct/incorrect use, hydrogeology systems, GIS data processing and mapping), a knowledge-base for water systems is to be designed by the OH project as a tool for future interventions in the PA and neighbouring or similar environments. After that, it is advisable to disseminate all results, initiating an educational and public awareness activity on the water cycle, from weather forecasting (see TriM’ activities) to hand-dug well management.

4.5 – ECONOMICS

A great deal of efforts are being made in assessing and valuing the economic ratio costs/revenues of One Health, although comparing measurable costs with supposed revenues exclude the immaterial value of long-term benefits, like self-determination, environmental preservation, cultural development,

¹²⁴ No surprise: the term ‘malaria’ itself comes from the Latin *mala aer*, ‘bad air’, because in Europe the sickness was believed coming from exposure to the mephitic atmosphere of swamps.

¹²⁵ See TriM’s report and plan of activities in the project framework.

sustainability, etcetera. It is even excessive (editor's critic) the insistence on added economic value vs. curative effectiveness as a criterion to favour adoption of One Health at public health levels.¹²⁶ Anyway, the World Bank directly recognises the economic value of the OH approach:

The impacts of infectious diseases extend beyond direct morbidity and mortality. [...] Infectious diseases also affect economic, socio-cultural, educational, health, and other development objectives. In essence, these disease events, whether persistent or sporadic, lead to cycles of disruption and limit the ability of communities and countries to pull themselves out of poverty. Achieving local and global health security [by a OH approach] can advance the World Bank's twin goals of poverty eradication and shared prosperity, and associated sectoral gains (e.g., environment, agriculture, disaster risk reduction).¹²⁷

During our mission, though, the economics of One Health were left aside for lack of due scientific research in the Project Area. Even the proposed project activity of the VICOPA ('Village Community Banks') in a high number of locations (13, but unidentified at the moment of the mission) could not be explored because no activity related to economics was going on at that moment. On October 30, the editor started an interview with Godfrey Sawenja, VSF-G senior project officer, a sociologist in charge of the VICOPA fund-generating activity for the OH project. We shared information about income generating activities and briefly discussed the economic side of the project. Sawenja, the first sociologist to be attached to a veterinary team in Kenya, provided sensible analysis about the difficulty to generate income in a place where money is considered useful but not indispensable by nomadic pastoralists.

This subject needs further research and understanding, because the real question is: what are pastoralists supposed to do with money? Buy camels? This is made very difficult by the loan-trust system (*dabare*)¹²⁸ that the Gabra face when dealing with the property of camels and their possible alienability to the market; this opportunity is practically non-existent, as far as tradition is concerned: the Gabra concept of personhood recognises animals – especially camels – as being "persons in their own right".¹²⁹

At North Horr, on October 10, Ibrae ('Sunday') Jillo, an elder, 58 years old said: "She-camels are very seldom sold, because they are part of the complex camel-trust system of the Gabra, by which most animals are given in loan in order to create and maintain the complex networks of their culture; we may say that the entrusting of dromedaries mimics the society at large; no impediment for he-camel sales, either for cash or barter".

Camels are the only recognised 'capital' by the Gabra, but, for instance, buying young dromedaries (the only available for the limited amounts of money a Gabra can dispose of, or in the mind of restocking program planners) – with the goal to make them milch camels – would delay 'profit' (i.e. milk, in a pastoralist's mentality) up to 3-5 years. Dromedaries are part of the family or clan, they are friends, social status, walking capital and food producers: to sell or buy them is like entering into the slave market, as far as the local perception is concerned.

The livestock market itself eluded research: in North Horr town, near the *baraza*,¹³⁰ there is the former livestock market, with kraals and dip-trenches (photo 25). The market is not operative because the herders discovered that the price they could get there is inferior to the one offered by direct buyers, who reach the pastoralists on the outside locations or directly in the bush, saving transfer problems and trading commissions. This has to be checked and rearranged, because by this system – although advantageous at the economic level for pastoralists – the traders skip all animal health controls by the County and are independent from up-dated Kenya market prices.

In the PA, money may be needed, of course, but it is somehow despised. That is why all development agencies target women – supposed to be more practical – in their income-generating activities, but to not much avail: at the end, the head of the family, the herdsman, runs the pastoral economy.

¹²⁶ Zinsstag *et al.*, "Measuring added value from integrated methods", in Zinsstag *et al.* (2015), *op. cit.*; pp. 52-59.

¹²⁷ World Bank, *One Health. Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface*, Report No. 122980-GLB, Washington 2018; p. 1.

¹²⁸ For details, see Sora T (1997), *op. cit.*

¹²⁹ Kurewa AG (2018), *op. cit.*, Ch. "OR - Population".

¹³⁰ A common ground, with an iron-sheet lean-to, where public meetings and social events are usually held.



Photo 25: the abandoned North Horr Livestock Market (courtesy by Demarchi, TriM)

To tackle the economic aspect of livestock breeding, security and health-maintenance, at the beginning of our mission (North Horr, October 09) we entered a shop in the town centre advertising insurance for pastoralists about droughts. The owner is only informing pastoralists and directing them to Yara Gollo, dealer of the Takaful Insurance Company. According to him, the system of insurance was developed from the scientific research by ILRI (International Livestock Research Institution) using their index-based satellite system for livestock insurance among pastoralists. This kind of insurance deals only with drought-risk cases. The satellite system gives a risk assessment about any hazards of incoming droughts. Thereafter, the pastoralists may insure a certain number of their animals at a fixed price; for instance, 10 shoats would cost a fee of 780 Ksh, one cow 780 Ksh, dromedaries obviously more (price undetected). The insurance system is based on info coming from satellites; according to the hazards and probabilities of a drought risk, a sum is calculated and fixed for all types of livestock. Sometime before rains, like in January/February and August/September, quotations are 'scientifically' given about drought-risks. Then pastoralists may register their insurance, with different quotations according to the hazards of droughts.

No assessment is done on the ground thereafter: if the drought comes, pastoralists are refunded, no matter if they managed to save their animals or not. In fact, the whole thing is just like betting on future assets: if you are a good or lucky pastoralist you may gain. Apparently, the insurance company was at loss two years ago, while last year, with excessive rains, pastoralists lost their insurance money because the risk of drought was calculated nil. Vice versa, if the value of assessed risk is becoming surprisingly high, the pastoralists gain.

In reality, reimbursement is not calculated at the market-value of animals, but on the expenditures a pastoralist may meet to keep his livestock alive throughout the drought period, scientifically calculated by ILRI. The process is similar to bookmakers' quotations, changing according to bets and condition of racehorses or football players health-status. AfriScout web maps (by Project Concern International and USAID) are already giving updated information about grazing areas, conflicts, water availability, etc. According to PCI¹³¹ "the AfriScout mobile service provides current water and vegetation conditions on localized grazing maps, enabling pastoralists to make more accurate and cost-effective migration decisions, improve pasture management and collaboration, reduce the risk of herd loss". Insurance sub-agents are distributed all over the territory.

We pointed out that AfriScout works from satellite to the ground (the definition is too low for accuracy for any Decision Support System), while our project tends to involve pastoralists in the monitoring system ('living sensors'), increasing pinpoint information from the ground to be processed and returned afterwards (two-ways info system). We asked if there is a similar insurance action about human and animal health,

¹³¹ See PCI website in <https://www.pciglobal.org/afri scout/>, last retrieval on January 2019.

conflict problems, raiding, etc., but apparently the risks about these issues are too high to be profitable if compared to the population of potential customers.

At Eel Isaako Malla (October 10), Guyo Yattani, aged 61, one wife and 6 children, responsible of 50 households, being asked if he ever made such an insurance, answers: “Once I managed to get 10,000 Ksh (about 100 €) from Takaful”. And shrugs, while carving a twig with his knife.

4.5.1 – REMARKS AND SUGGESTIONS

Paraphrasing a famous sentence,¹³² you may not be interested in economics but economics is interested in you. This is applying to a controversial concept like One Health. According to the World Bank:

Because the economic risk of disease at the human-animal-environment interface is already substantial, the expected rate of return on investments in prevention through strengthening of veterinary and human public health capacity is very high. [...] The limited application of One Health in practice, however, limits data available to analyze its benefits. As with any public health program, One Health investments should be analyzed against their objectives, but also begin to create an evidence base for One Health-specific indicators that can help optimize its application.¹³³

Zoonotic disease outbreaks can lead to huge economic consequences. Estimates of risk – from \$ 37 billion (World Bank, 2012)¹³⁴ to \$ 60 billion (U.S. National Academy of Medicine, 2016) – are the expected economic impact of a pandemic (most probably a zoonosis) in any given year. In these estimates, disease-impacts on human health are treated as follows. Increased mortality and morbidity (illness) during a pandemic are valued at the market cost of labour. For instance, a premature death that shortens a working life by 10 years has an economic cost, which is equivalent to the foregone wages during 10 years. This is a standard analytical method, which has yielded estimates of costs of a severe pandemic of 4–5% of GDP across a number of simulations.

From the public health institutions’ perspective, investing in One Health is anyway beneficial compared to targeted uni-sectoral approaches that can also achieve prevention or control. The World Bank states:

Broadly, One Health may generate the following effectiveness and efficiency outcomes, which in turn can generate financial savings at global, national, regional, and local (OH project in our case) levels: a) improve effectiveness of public health systems in achieving prevention, early detection, correct diagnosis, and control of outbreaks. The outcomes of more effective responses are lower morbidity, lower mortality, and lower economic costs. Effective responses may promote poverty reduction – especially given that many zoonotic diseases are called the ‘diseases of the poor’.¹³⁵

Regarding ecology, the ‘worst scenarios’ are connected to climate change, that interferes with the actual health interface human-animal-environment, from which the above projections are calculated. But all this does not consider the loss – in terms of food security, capital and status – a sick pastoralist is facing when leaving his/her herds to look for health assistance.

Now, we have a problem: how can we estimate a “market cost of labour” of a pastoralist? Does money have any operational meaning in a One Health project among pastoralists? What about if we modify the actual disconnection of North Horr people from the wage market? These questions were not addressed during our mission, for absence of a competent officer about pastoral economy during the short period we

¹³² “You may not be interested in war, but war is interested in you”, misattributed to Leon Trotsky (who spoke of dialectics, not war) in an epigraph in *Night Soldiers: A Novel* (1988) by Alan Furst.

¹³³ AA VV, *One Health. Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface*, International Bank for Reconstruction and Development/The World Bank, Report No. 122980-GLB, Washington 2018; p. 33.

¹³⁴ AA VV, *People, Pathogens and Our Planet: the Economics of One Health*, The World Bank, Report No. 69145-GLB, Washington 2012.

¹³⁵ World Bank (2018), *op. cit.*; p. 34.

spent in the field, a situation that should be rapidly redressed by the OH project management. By our observations we may only say that enhancing health (in all meanings) may have an intrinsic economic value. Around North Horr we noticed a relatively recent increased commercialization of the livestock sector. This benefitted those with large herds (mostly the absentee livestock owners), while those without sufficient herds to keep them mobile are hived-off the pastoral system. They settle and seek alternative forms of livelihoods such as jobs in town and casual employment. Settling habits forgo a return to nomadism, and they are more and more becoming a constraining factor for the mobility of households around trading centres. However, while small stock is increasingly commercialised, camels are still not easily sold or exchanged in the market. Further, the livestock trade is compounded with challenges as they lack government support and incentives to tap into better pricing of the animals.¹³⁶

Of course, remembering that at the moment no veterinary nor economy operators control marketplaces (inactive even in major centres like North Horr), we recommend to foster a proper insertion in the livestock market by pastoralists of the PA. We have to consider, though, that this would propagate the erosion of camel-values in the social network, with unpredictable outputs at household levels, like the enhancing of individualised cash economy vs. family bonds, or unprepared insertion in consumeristic trade/buying of 'alien' goods.

A second challenge we faced in the field is constituted by infesting plants (see 4.4.4). The pastoralists ask for direct eradication, without considering costs vs. revenues, but seeing only immediate benefits for their livestock. On the other hand, for instance, algarroba may provide construction poles, but above all excellent firewood and charcoal, if properly managed.¹³⁷ Charcoal production and use is the 'energy crisis' of Africa, therefore algarroba must become an asset, not a pest. During a preliminary survey in 2014, the Kenya Forestry Research Institute and the Forest Department found the value of *Prosopis*-based income in 2002 to be Ksh 154,882 (US\$ 2,122) per household per year.¹³⁸ This trade developed spontaneously even without permits needed for transporting charcoal and with no access to invaded government and communal land. Overcoming these barriers could see a large increase in revenues earned and land cleared, just for fuel and fodder. Businesses and small industries can develop with no need of money prompting, an activity that – if some restrictions are lifted – will properly deal with such a common and 'free' resource, at the moment a monster in the eyes of pastoralists. In some countries, *Prosopis* has been called the 'tree of the poor', but it could, with a little help, become the tree which helps lift the 'poor' (not a Gabra concept, because "if you're poor you're dead") to a better and sustainable life. There is a price: people dealing with structured economic activities cannot be nomads: they have to settle down and enter business, trade, commerce, receipts, order sheets, payment bills, money.

Nobody wants to bar pastoralists from free access to modernity and leisure goods (satisfaction is part of well-being and health, in the long term), but the One Health project management should be very careful to deal with side-effects of entrepreneurial business, at whatever scale.

For instance, VICOBA activities target mainly women in settled centres: this may alienate power from men who, in the long run, shall take over the money anyway (converting it in booze or goods, it makes no difference to their spouses), because of their progressive sedentarisation in towns to check women's business and profit. Women may become collateral victims, at the end.¹³⁹

¹³⁶ Kurewa AG (2018), *op. cit.*, Ch. "Pathway to modernity".

¹³⁷ See Choge SK and Pasiecznik NM, "The challenges of eradicating *Prosopis* in Kenya", HDRA, UK 2005.

¹³⁸ Choge SK *et al.*, "The Status and Impact of *Prosopis* spp. in Kenya", KEFRI, Nairobi 2002.

¹³⁹ The editor witnessed a similar case among the Turkana; women were helped by AMREF to form a cooperative, in order to better sell on the market the quantity of milk their husbands allocated them for the purpose of health and education expenses for their children; when the business became profitable, men took over the cooperative, as by power customs, and the women remained without either the milk and the money.

Chapter 5 – CRITICALITIES AND CONCLUSIONS

5.1 – FOR WHOM THE CAMEL-BELL TOLLS

The humanitarian agencies must not take need – from lack of food to poverty, from security to health problems – for granted. The “Don’t ask, don’t tell” syndrome we experienced in the field – the fact that health is a very sensitive topic for pastoralists in the whole PA – is a reminder that all projects should have an accurate operational research (OR) at their base, funded and implemented *before* being planned and designed. In case of negative outputs from the OR, the draft of the project *must* be corrected and redressed. Much more so when the benefit – enhancement of health status – has bottom-up implications that prevail over any top-down consideration of scientific/humanitarian ‘goodness’.

All in all, the mission highlighted the positive approach to One Health by the pastoralists of the PA, even if unconscious. Outside this micro-scale, we learnt how good an investment are the OH projects. According to Harvard economist and former U.S. Treasury Secretary Lawrence Summers, the high pandemic risk makes investments in veterinary and human (note the absent environment) public health systems “possibly the most productive investments on behalf of mankind”.¹⁴⁰ But for us it was a bit embarrassing to try, on October 15, to convince Adano (‘Friday’) Guyo, about 80 years old, responsible of 57 households in Kanacho, that *he* needed *us*, and not *vice versa*: he kept sculpting a wooden camel-bell (*kokke*, the big one for males with two clappers, females have only one); he used his iron adze, with slow care, on *sukella* wood (*Delonix elata*), a tree with large white flowers, not available around. While chatting women led their donkeys back home from the hard water-fetching chores, some elders were playing *bao*, the ubiquitous African board-game of the *mancala* type. The whole scene, involving people, animals and the hardships of a controlled environment, conveyed the notion that, around North Horr, One Health was already operative since ages.

During missions like this, with ‘alien’ people minding their business while you try to interfere with their lives, it is important to keep a critical perception of the process going on. For instance, during the field mission it was not possible to understand how the project-implementing partners might harmonise, both within the OH framework and in fulfilment of their individual responsibility. In order to move forward, it will be important to come up with an implementation framework for all partners to ensure that the project fulfils its intended goals. In a nutshell: One Health is not multi-disciplinary (‘many issues’), but inter-disciplinary (‘entangled issues’). Epidemiologists must better understand animal ethology and physiology (keeping an eye to cloudy skies), while veterinaries have to enter in pastoralists’ customs and mind-sets (being aware of weather conditions and grass growth-rate); in the meantime, ecologists must stop thinking that the world environment should be better off without people and domesticated animals around (environmentalists already look at the clouds).

This means that all scientific personnel involved in the OH project must contemporarily share his/her professionalism and knowledge, while adopting the ones of others, in perception and in action.

5.2 – ZOONOSIS FOR EVER?

Over the last 18 years, our planet has faced more than 15 deadly zoonotic or vector-borne global outbreaks, both viral (e.g., Hanta, Ebola, highly pathogenic avian influenza [H5N1 and recently H7N9], West Nile, Rift Valley fever, norovirus, severe acute respiratory syndrome [SARS], Marburg, influenza A) and bacterial (e.g., *Escherichia coli*, *Yersinia pestis*, and *Bacillus anthracis*, the causes of hemolytic uremic syndrome, plague, and anthrax, respectively). Since 1980, more than 87 new zoonotic and/or vector-borne EID have been discovered.¹⁴¹ This led to a focus on zoonosis as the *main* topic of One Health debate and

¹⁴⁰ Cited in AA VV, *One Health. Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface*, International Bank for Reconstruction and Development/The World Bank, Report No. 122980-GLB, Washington 2018; p. 31.

¹⁴¹ Gebreyes WA *et al.*, (2014) “The Global One Health Paradigm: Challenges and Opportunities for Tackling Infectious Diseases at the Human, Animal, and Environment Interface in Low-Resource Settings”, *PLoS Negl. Trop. Dis.*, Vol. 8,

projects. On the other hand, humans serve as a primary reservoir for only 3% of known zoonotic pathogens. Yet the capability to identify outbreaks of these diseases relies on identification of human cases. This might be redressed inside the cultural framework and the close association that people in the PA (like most pastoralists) keep with their animals, considered to have a *persona*.¹⁴²

According to Diane Frank:

About two-thirds of 'emerging infectious diseases' (EID) result from zoonoses; the majority of these have their origin in wildlife (71.8%) and have been increasing in recent years. The researchers found that 54.3% of EID events were due to bacteria, and that their database included a large number of drug resistant organisms. [...] There is a high correlation between EID origins and socio-economic, environmental and ecological factors, thereby providing a trigger-mechanism in areas (called 'emerging disease hotspots') where EID are most likely to originate.¹⁴³

Effective surveillance of zoonotic pathogens and control of the diseases they cause requires therefore more integration across human and animal populations in their environment. Such integration is lacking in contemporary veterinary and medical communities. As a first step we advise the local authorities, assisted by the OH project, to design and implement accredited veterinary and public health diagnostic laboratories with a shared database (if not communal facilities and laboratories), accompanied by an improved use of existing natural resources and implementation of environmental protection campaigns.

On November 08, during a brainstorming about guidelines and recommendations after the Anthropology-Ecology mission, the editor suggested to broaden the OH relevance of the project *outside* the topic of zoonosis, by selecting a viable number of 'pilot' diseases – decided upon by both all components of the OH approach and the informed local pastoralists – to reduce the vast scope of the project and to integrate zoonosis in a wider public health domain. In particular, the subset of diseases could include a restricted and manageable number of: a) zoonosis (most prevalent appear to be brucellosis, PPR, anthrax); b) animal vector borne diseases (malaria is perceived by pastoralists as their most common health problem, if we exclude common cold); c) diseases that are particularly significant in OH terms and relevant to pastoralists (e.g., specific camel diseases and shoat bloating). Being at the beginning of the project, this would allow: a) experimentation of procedures in pastoralists' participation (CHS and AHS); b) disease classification (epidemiologists, both veterinary and medical), c) knowledge sharing (education), and d) mapping (TriM).

5.2 – PATHWAYS TO CONSENT

The editor, who collaborated to the elaboration of the concept of One Health since 2003 ("One Medicine" in K'elafo and "One Health" in Filtu, both in the Somali Region of Ethiopia) during the mission started having doubts about the effectiveness of the paradigm, too far from the factual situation on the ground. One Health needs appropriate operationalisation.¹⁴⁴ Therefore, during the field mission we suggested to change the usual OH logo "healthy humans, healthy animals, healthy environment" (all end-states) into operative drivers : "Health to people→ Health to animals→ Health to environments". All plural.

According to Abdikadir Guto Kurewa, assistant anthropologist of the OH project, "one of the major constraints experienced during the field mission [of October November 2018] was the limited time to understand the complex social, economic and political dynamics, plus the variability of the environment within different seasons. [...] As such, it was not possible to understand the context within which the movement patterns are influenced during wet seasons and how this, in turn, affects the capacities of the local health facilities to cater health services. During rainy seasons, people move closer to the trading centres and this might cause pressure to the already weak and understaffed health facilities".¹⁴⁵ This is the

November 2014; available in <https://doi.org/10.1371/journal.pntd.0003257>, lately retrieved in January 2019; introduction.

¹⁴² The word is borrowed from the Latin *persōna* ('mask; character') to denote a character or a social role.

¹⁴³ Frank D (2011), *op. cit.*, p. 1064.

¹⁴⁴ Lee K and Brumme ZL, "Operationalizing the One Health approach: the global governance challenges", *Health Policy and Planning*; Vol. 28, 2013; pp. 778–785.

¹⁴⁵ Kurewa AG (2018), *op. cit.*, Ch. "Constraints".

correct OH approach: health outputs (catered services) are influenced by cultural dynamics (human), movements (animal) and seasonality (environment).

The theme of ‘movement’ resounds again. During our mission we elaborated a ‘pathway model’ to be implemented from the very beginning. Like the mobile units of pastoralists, the OH project should move along 4 trajectories: 1) pathway to health; 2) pathway to water and pasture; 3) pathway to communication and social relationships; 4) pathway to modernity. The pathway model makes use of the mental set of pastoralists (see 2.4), integrating the health of the nomadic/semi-sedentarised people in the Project Area, accompanying them from traditional practices to modernity.

From the very beginning, this approach *bega kwa bega* (shoulder to shoulder) was limited and sometimes hindered by the lack of awareness, dissemination and informed consent before the Anthropology-Ecology mission. The Free, Prior, Informed Consent (FPIC) procedure is compulsory and operational at United Nations level.¹⁴⁶ At the cooperative house of Dukana (October 16), the area chief Tuye said in front of a dozen elders: “NGO come around asking questions and making unfulfilled promises. I want to know more about how impactful and relevant the OH project is to the needs of the pastoralists of this area”. The editor answered to his capacity, and concluded saying that “the community has the right by law to interrupt any project they don’t agree with”. Finally, the elders gave their blessings and a simplified (verbal and invalid) form of consent for the project and the field team.

At Daga Boji, while talking to Jihike Jibba (‘Born with full moon’) Bulo, the editor saw a very old and big *Salvadora persica* encroaching a semi-dead tree with its branches and roots. He then spoke with the old man about development as an encroachment of the local culture: “Development may come, and it looks very good. But as it grows, it will take the local customs with it, strangling them under the shade of its shining foliage. This is not necessarily a bad thing, but now you have to decide if you want to accept this trend or not”.



Photo: The Strangling Tree at Daga Boji (courtesy of Demarchi, TriM)

At Hori Guda (October 27), an elder named Toore (‘Milk for coffee’, meaning great abundance) spoke at the end of our discussion: “Excuse us all for not having camel milk at hand to offer. Goodbye”.



¹⁴⁶ The normative framework of FPIC consists on a series of legal international instruments including the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), the International Labour Organization Convention 169 (ILO 169), and the Convention on Biological Diversity (CBD), among many others, as well as national laws. Operative information in the manual: AA VV, *Free Prior and Informed Consent. An indigenous peoples’ right and a good practice for local communities*, FAO, 2016.

ANNEXES

APPENDIX A – ORAL STORIES (written by Alberto Salza)

Note: the mission team suggests that all OH training material be locally designed as structured packages of short oral narratives, to be repeated as such, in order to avoid any misunderstanding in drawing perception, as repeatedly experienced in the field.

THE THREE STONES OF ONE HEALTH

Once upon a time, a medicine doctor managed to cross the Chalbi desert. He rested at the fringe of it, inside the *durte* bushland (*Suaeda monoica*). In the evening, he felt cold and tired: he needed some tea. Coming from a distant town, he didn't know the survival lore of the desert. Anyway, he managed to make a small fire with some dry branches. He placed his pot directly on the fire, but this put the fire off. A very old man was passing by: "Use stones to keep it *upon* the fire", he advised the doctor. So the doctor – a bit slow in his mind, we must admit – took a single stone (stones are difficult to find in the sand) and placed it inside the newly-lit fire; then he tried to put the pot on the single stone, but it spilled all the water: fire out again. A young herder passed by with his livestock – they are constantly on the move, you know – and advised: "More stones work better". So the doctor added another stone (he was quite lazy and scared of scorpions in the incoming evening). He re-lit the fire and put the pot over the two stones: imagine the result. A woman appeared, gave him a third stone and went away shaking her head. "That's the trick!" exclaimed the doctor. He arranged the three stones around the fire, put his pot firmly on them, and eventually managed to prepare his tea. Well, that is how he understood the complex relationships inside the One Health components: people, livestock and the surrounding environment act together to keep the pot of health steady and working. If you provide at the same time health to people (first stone), to animals (second stone) and to the environment (third stone, the one that gives balance to the kitchen fireplace, not by chance suggested by a woman) you may provide global health to the community.

THE COMPLEX TEA

We all drink tea. For us, tea is like petrol when moving around the plains of Dida Gola or on the hills of Tulu Dimtu. What do you need to prepare tea? (*elicit answers*) First water. Then tea leaves. And sugar; somebody of Somali origin might add salt, but let's leave it aside; it's good for the thirst, but not for taste. Is that all: water, leaves and sugar? No, you need fire to boil your water. With the energy of fire you manage to dissolve the tea-leaves properties inside water (see the spreading colour?), while sugar melts completely.

You started with three simple elements, put them together, added energy. The product is now complex, that means quite different from the sum of its components (who would have guessed the taste of tea before preparing it?). But complexity has a special characteristic: in a complex system you cannot tell which component is more important: water, sugar, tea-leaves, fire? And you cannot go back: you will never be able to take your tea and make it back to leaves, water and sugar.

The same principle applies to One Health: once implemented, you cannot separate the health of humans from the one of their animals and the environment where both are living in. And the fire, the energy to make this process possible, well: that is the local knowledge and culture of the people.

THE BARARATO BIRD

Living and non-living things were inhabiting the same place, and there was no difference: they talked, interacted, moved around and lived in peace like human beings should do.

In those days, Water was a quiet male who generously offered his services to the community of the living and the non-living. He inhabited many places. Do you know some of them? (*elicit a fast brain-storming*).

In that particular moment Water was living on top of Chalbi, making up a huge lake (*scientific info: it was like that 10,000 years ago*).

All living beings were freely making use of Water, but some started polluting it by peeing in it, spitting, throwing waste and dirt, washing their clothes and so on.

Water lifted his eyes to the Sky to get some patience and endurance. People were taking his kindness for weakness; so eventually he spotted a very beautiful lady, able to make him shine in the morning and at sunset, out of reflective power. The lady was the Sun (*feminine in Gabra language, like in German*) and she fell so much in love with Water that she wanted him only for herself.

She put so much energy to him with her fiery arms that eventually she sucked all his power out, and Water was lifted to the sky in form of clouds, being they just evaporated water. She left only his hair behind; that is the bush called *d'urte*, too salty for her kissing taste.

Wind, who was a former lover of Sun, became jealous of the relationship between Water and Sun, so he tried to interfere, using his force to blow clouds away from Sun. Sometimes he was so angry that he tried to lift the soil to the sky, making a dust whirlwind, but to no avail.

Anyway, Cloud-Water (he took a new name) was happy because of being away from any nuisance, like greedy plants, animals or human beings.

Trees, grasses, animals and humans started regretting their misbehaviour: they were thirsty and all of them were weak and almost dying out of drought. While they were weeping, wasting good drinking water out of their bodies, a small bird came in. He talked in a funny way and people were a bit annoyed, trying to chase him away. "My name is Bararato" (*a small bird described as black-and-white or dark brown or even yellow, supposed by Gabra to signal rain at night*) he said, "and if you shelter me from Sun, who is looking after me because I stole some shining beads from her necklace, I can help you solve this Water problem".

So animals and humans created some shade for Bararato, inventing huts and pens.

After some time, Bararato started making a special music (*ask the pupils what is its sound*). It was so enchanting that Cloud-Water eventually relaxed so much that he felt *singizi* (*sleepiness*) and fell heavily asleep *fofofo*, the way babies sleep, making sweet sounds with their breath.

Bararato continued his song until Cloud-Water fell from his bed back to the Earth, becoming a new thing: Rain-Water, and everybody lived happily thereafter; but up to date Bararato is still called to his duty when rain is needed. And so he chants into the night.

The moral of the story is: never disturb what is needed (*to be elicited from students*).

THE STRANGLING TREE

Down yonder you see a big *aade* tree (*Salvadora persica*). By its massive, contorted trunk we know it is very old. It must have been quite strong, to stand winds, droughts and floods for so many seasons. But if you look inside its brilliant green foliage – and forget its peppery red berries, so good at taste – you might see a skeletal tree, still standing but nearly dying. It looks like a *d'adacha* (*Acacia tortilis*), but who can tell now: the *aade* is all over it.

Well, the story says that when the *d'adacha* was young and straight, ready to provide people with its little olives, just then the wind blew near it a small *aade* seed. The *aade* was helpless: it could not stand by itself: it needed support. And the good *d'adacha* offered help. "Lean on my branches" it said to the *aade*, "I am strong enough for both of us". And so it was, for years.

But the *aade* grew thick: its roots started drinking the water and the minerals in the nearby soil, preventing the *d'adacha* to reach them; the *aade*'s foliage, so green and thick, absorbed all the energy from the sun. So the *aade* prospered, while the *d'adacha* is now close to its end.

The *d'adacha* tree is like the pastoralists' culture, and the *aade*, so strong and beautiful, is like modernity. Development may come, and it looks very good. But as it grows, it will take the local customs with it, strangling them under the shade of its shining foliage.

This is not necessarily a bad thing, but now you have to decide if you want to accept this trend or not. It is in your power to give a free consent or a refusal. *Almado dure men rooba talle*. Oh blessed New Year, bring us rain.

APPENDIX B – ENVIRONMENT SPOTTERS & STRINGERS

Concept

The One Health project in the North Horr sub-County contains an asymmetry: the absence of environmental health personnel to side up the animal and human health operators, both at community (CHV and ADR) or at project (CHS and AHS) levels. This anomaly needs redressing.

In order to balance the 3-component OH approach, we suggest to train, insert and experiment in the field – during the three-year period of the project – two innovative local figures, that in the future might become standard personnel at North Horr County level (Departments of Health, Livestock and Environment). They are the:

- a) OH Community Environment Spotter (CESP)
- b) OH Community Environment Stringer (CEST)

Both figures are to be sided up by a One Health Environment Expert (OH EnvExp) for environmental and climatic data elaboration (for the moment being, a consultant assisted by TriM and DIST).

Definitions

A *spotter* is someone trained to look for terrain features and to provide intelligence about them. For instance, a “weather spotter” is an individual who observes the ongoing weather to inform other groups, while a “storm spotter” is a spotter who observes and relates extreme weather events.

A *stringer* is a freelance operator (like a journalist or video-photographer) who contributes to an organisation with reports, photos, or videos about a difficult or remote zone on an ongoing basis. The term is typical of news industry jargon, but it may be used in our case because it conveys the idea (see its etymology) of adding “pre-elaborated strings” to the raw information by spotters, before being conveyed to the Environment Expert and researchers.

Functions

Community Environment Spotters would act throughout the project area – being part of and inserted into the nomadic pastoralists – in combination with OH-trained CHV and ADR, forming the first grid of data collection and mobilisation about the health/disease status of people, animals and micro-scale environments.

Community Environment Stringers would form the One Health Unit with OH-trained CHV, ADR, CHS and AHS, adding into the OH project framework the environmental issues at 360° (in addition to weather/climate-related features), considering the whole project-area (PA) ecosystem at medium scale.

Guidelines

Finding spotters requests time, resources and full support by many different communities, while stringers can – from the very beginning – be trained at centralised level in North Horr. Therefore we suggest for the moment being to concentrate the project’s efforts on an intermediate figure, an ‘augmented spotter’ being progressively formed – directly in the field – to become a stringer able to train qualified spotters in the end. For the moment, the experimental augmented-spotter and future stringer does not need specific education levels, because the main features of his/her position are community-based inside the local environment and aptly interface with the OH project framework. This figure should have:

- a) Full knowledge of the PA, having visited its 7 main localities: North Horr, Dukana, Eel Hadi, Balesa, Malabot, Gas/Gallas, Kalacha;
- b) experience and sense of belonging as a pastoralist in Arid and Semiarid Lands (ASAL) ecosystems;
- c) acknowledged authority and moral standard among the local communities, throughout the PA;
- d) fluent command of the Gabra language, spoken and written;
- e) good command of the English language, spoken and written, with Swahili as a bonus (not a pre-requisite for future spotters);
- f) fair capability in the use of mobile cell-phone devices, GPS and photo-taking ability, practice in specific environmental pps;
- g) knowledge about the One Health model, relevant maps and project framework.

To bypass gender issues, in the future a male and a female stringer are to be chosen and trained, not to discard the role of women in the pastoralist settings about the environment use and protection.

Necessities

Full mobility within the OH project missions and outreach activities must be granted to the experimental “augmented spotter” or stringer.

The spotter should be encouraged and provided with means to accompany pastoralists along their routes, on foot if necessary.

Formal permission by the local Education authorities to work inside schools – in order to create a network of “Environment clubs” – should be granted, in order to fulfil awareness and dissemination of information from the grass-roots.

Even if previous participation in OH project training and workshops is an asset, permanent formation for the stringer should be considered as the most effective mean of two-way transfer of information throughout the project duration, and especially during all expert missions in the field.

In the future, spotters must have the same status, treatment and incentives of CHV and ADR, while stringers must be subject to the same contract conditions of CHS and AHS while inside the OH project framework.

The ‘augmented spotter’ should be capable of performing the following actions (besides what already cited in *Guidelines*):

- following the vegetation guidelines provided by TriM, he/she shall collect data about vegetation (location and type) within the PA; particular attention should be given to the location of pasture areas and the state of grasses in relationship with amount of rainfall received;
- collect data about pasture areas characterized by presence of enough/good pasture and by lack of it; in this case, get information about where animals had to move;
- validate information about palatable/unpalatable vegetation and integrate it with additional information (quantitative or qualitative), about threats posed by non-indigenous vegetation such as *Calotropis procera* and *Prosopis juliflora*;
- following the water-point guidelines provided by TriM, collect data about water-point locations and characteristics (water quality, water availability, incidents related to poisoning or pollution) in the PA;
- following the qualitative scale provided by TriM and agreed with DIST, collect qualitative weather information about precipitation, temperature and wind conditions in North Horr and within the PA (by means of received phone calls, or on-site geo-localization when travelling with the CCM/VSF staff).

By Alberto Salza, CCM's consultant

APPENDIX C – TRAINING EXERCISE

ISSUE: One Health concepts, with all OH personnel and VSF-G interested elements; summary of contents:

- 01 – refreshment of the One Health concept, at the moment unclear;
- 02 – relativism of health in various cultures;
- 03 – modelling the OH triangle Environment-Livestock-Pastoralist;
- 04 – what is a 'healthy environment'? Healthy vs. Healthful;
- 05 – biunique but asymmetrical relationship human-animal health among pastoralists;
- 06 – cultural bias among the Gabra about their health situation;
- 07 – environment carrying-capacity as a critical measure to be revised;
- 08 – model of resource use in hunter-gatherers, agriculturalist and pastoralists economies;
- 09 – movement as an imperative for pastoralists to deal with sparse and low-quality resources like grass;
- 10 – elliptical model of grazing and water use by pastoralists and risks of sedentarisation around a borehole;
- 11 – fusion and fission model in pastoralists and the unifying *sorio* ceremony);
- 12 – the focus should be on local diseases and not on general bio-health issues;
- 13 – the 3 components of OH should always be considered as a product and not as a sum ($1 \times 1 \times 1 = 1$, not $1 + 1 + 1 = 3$);
- 14 – examples of info to be gathered in Health dispensaries (e.g., connect drugs to humidity/temperature to have them supplied on demand and just in time);
- 15 – excessive use of anti-parasite dips for livestock may pollute the local environment, contributing to the cancer risk that is one of the major topics about human health around North Horr;
- 16 – zoonosis must be considered in the general OH framework and not as its major issue;
- 17 – examples of OH research, where all operations must consider at least 2 OH components;
- 18 – distance from health posts as a triage system for sick pastoralists;
- 19 – gender bias in personnel selection and utilisation;
- 20 – the 3 components in OH are very clear to pastoralists in their livelihoods;
- 21 – 4 pathways concept (social pathway is illustrated by two movement patterns by Gabra pastoralists, not understandable without knowledge of the social context);
- 22 – design of external tools to health and resilience;
- 23 – natural, anthropic and inner environments.

The two-hour exercise was well followed and accepted, but it highlights the lack of full understanding of the environmental component in the OH project by all participants. A major involvement is anyway towards the climatic and weather issues, that shall be more elaborated in the TriM's workshop (check also the mission of DIST in Nairobi).